California Regional Water Quality Control Board
Santa Ana Region

December 20, 2004

Item: 16

Subject: Supplemental Staff Report: Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake

On November 1, 2004, staff made available for public review a staff report that includes a discussion of proposed changes to the draft Lake Elsinore and Canyon Lake Nutrient total maximum daily loads (TMDLs) that were presented at public workshops on June 4, 2004 and September 17, 2004. Since the release of the November 1, 2004 staff report, staff has received input from the US Forest Service and Elsinore Valley Municipal Water District that warrants additional changes to the proposed TMDLs. This supplemental report describes these additional changes, which are shown in the Errata Sheet for the proposed Basin Plan amendment (Attachment to Resolution No. R8-2004-0037).

In summary, the proposed additional changes are:

- Deletion of the proposed final numeric targets and TMDLs for total phosphorus for Canyon Lake and Lake Elsinore. The proposed interim total phosphorus numeric targets and TMDLs for both Lakes would become the final targets/TMDLs. Compliance with the new final targets/TMDLs would continue to be required as soon as possible but no later than 2020.
- Revision of the nitrogen and phosphorus load allocations for forest/open space lands in the Canyon Lake TMDL.
- Revision of the nitrogen load allocation for forest/open space lands in the Lake Elsinore TMDL.
- Revision of the wasteload allocations for supplemental water in the Canyon Lake TMDL.
- Revision of the remaining wasteload and load allocations for nitrogen and phosphorus in the Canyon Lake TMDL to reflect the revised allocations for forest/open space and supplemental water.
- Revision of the remaining wasteload and load allocations for nitrogen in the Lake Elsinore TMDL to reflect the revised allocation for forest/open space.

<u>Revision of the Load Allocation for Forest/Open Space Lands</u>

Staff of the US Forest Service indicate that forest lands in the San Jacinto River Watershed are natural forest lands with little, or no, human disturbance. Therefore, they state that any nutrient loads emanating from the forest areas are natural and no reduction of these loads should be required. Forest Service staff provided data and information to support their position about the natural levels of nutrient runoff from non-anthropogenic sources. These data are presented in the Attachment to this Supplemental Staff Report. The data were drawn from publications on nitrogen and phosphorus export rates, including the US EPA Nutrient Criteria for Rivers and Streams in Ecoregion II (Western Forested Mountains) (US EPA, 2000), studies on forest land

nutrient export in the nation (Binley, 2001) and forest studies in Southern California (Meixner et al., 2003).

Based on a review of the data, staff agrees that the nitrogen load as simulated by the LSPC watershed model (and calibrated with field data) from the forest lands in the San Jacinto River/Lake Elsinore watershed is within the range of the nitrogen loads from natural forested watersheds in Southern California. Therefore, it is not reasonable to require reduction of that load, as originally contemplated in the proposed TMDLs. As proposed in the November 1, 2004 staff report, for Lake Elsinore, an 11% reduction in the nitrogen load was required to meet the final nitrogen TMDL, and for Canyon Lake a 18% reduction in the nitrogen load was required to meet the final nitrogen TMDL.

For phosphorus, staff compared the average phosphorus load from western forests (US EPA and Binley data sources (see the attached tables); no phosphorus load data for natural forest lands in Southern California is available at this time) with the phosphorus load from forest lands in the San Jacinto River watershed simulated by the LSPC model. The modeled phosphorus load from the forest land in the San Jacinto River watershed is higher than the median and/or average phosphorus load from other western forests in the US. It is unclear to staff if this is due to the fact that some human-induced disturbance is occurring on forested lands (i.e. septic systems, campgrounds, etc). Staff has asked US Forest Service staff to provide information on exact land uses within the lands under their jurisdiction. Until those data are obtained and reviewed, staff determined that a five percent reduction from the current San Jacinto River watershed forest land phosphorus load is needed to ensure that the phosphorus loads are within the range of other natural US forests. The proposed Canyon Lake TMDL previously incorporated a 56% and a 79% phosphorus reduction requirement from these lands to meet the interim and final TMDLs, respectively. For the Lake Elsinore interim phosphorus TMDL, no reduction from forest/open space lands was needed, and a 42% reduction from forest/open space lands was required to meet the proposed final Lake Elsinore phosphorus TMDL.

The proposed revisions to the forest/open space nitrogen and phosphorus allocations lead to recommended changes to the phosphorus numeric targets, phosphorus TMDLs and nitrogen and phosphorus allocations for other dischargers, as discussed below.

Revision of the TMDL Numeric Targets

As indicated in the preceding section, staff proposes to revise the load allocations for the forest/open space lands in the San Jacinto River/Lake Elsinore watershed: no nitrogen reduction would be required and a 5% phosphorus reduction in loads entering Canyon Lake would be required.

Modification of the proposed Canyon Lake final phosphorus TMDL to include a 5% reduction in the forest/open space load would result in a phosphorus load allocation for forest/open space that is about the same as the external phosphorus load capacity (2,037 kg/yr versus 2,064 kg/yr, respectively). This means that there would be no phosphorus load allocations available for other sources. In staff's opinion, this is not reasonable. Therefore staff proposes to delete the final total phosphorus numeric target (and the final total phosphorus TMDL (see below)) for Canyon Lake. Instead, staff recommends that the interim phosphorus numeric target be used as the final target, with

compliance to be achieved as soon as possible but no later than 2020. For consistency, staff also recommends that the interim phosphorus numeric target for Lake Elsinore be used as the final target, with compliance to be achieved also no later than 2020. These proposed changes are shown in the errata sheet (Table 5-9n).

Revision of the Nitrogen and Phosphorus TMDLs

As a result of the proposed changes to the TMDL numeric targets for phosphorus, the interim total phosphorus TMDLs become the final total phosphorus TMDLs for Lake Elsinore and Canyon Lake. The revised TMDLs are shown in the errata sheet (Table 5-9p). Again, the compliance date is as soon as possible, but no later than 2020.

Revision to the WLAs for Supplemental Water to Canyon Lake

Elsinore Valley Water District staff (EVMWD) expressed concerns about the Canyon Lake supplemental water allocations. In the past, EVMWD has added Colorado River water to Canyon Lake that has been relatively phosphorus free. However, EVMWD has indicated that in additon to the Colorado River, supplemental water to Canyon Lake may also come from the State Water Project. Further, EVMWD has indicated that the volume of supplemental water will also increase up to 10,000 ac-ft per year. EVMWD wants to ensure that the use of supplemental water from all likely sources is accounted for and in compliance with the Canyon Lake nutrient TMDL.

EVMWD provided water quality data for each of these sources of supplemental water. Originally, the Canyon Lake supplemental water WLA was calculated based on the water quality data for the Colorado River water, and the volume of water added to Canyon Lake in April 2002 (1,006 ac-ft). In order to reflect the operational options available to EVMWD, staff proposes to use the average nitrogen and phosphorus water quality of all the available sources (TN = 0.3 mg/L, TP = 0.04 mg/L) and to assume the same amount of water addition (1,006 ac-ft a year). Even though the amount of supplemental water added may increase to 10,000 ac-ft, it is expected that the same amount of water would be withdrawn from Canyon Lake for treatment and delivery. Therefore, staff does not see this as a permanent addition of water to Canyon Lake.

Revision to the load allocations (LAs), and waste load allocations (WLAs) for the Lake Elsinore and Canyon Lake Nutrient TMDLs

As a result of the recommended revisions to the nitrogen and phosphorus load allocations for forest/open space and the wasteload allocations for supplemental water inputs to Canyon Lake, the allocations for other sources have to be adjusted to meet the TMDLs (load capacity). Specifically, as shown in Table 1 in the attachment, wasteload allocations for point source dischargers and load allocations for nonpoint source dischargers need to be reduced further from those specified in the November 1, 2004 staff report. Similarly, revision of the nitrogen load allocation for forest/open space in the Lake Elsinore TMDL necessitates redistribution of the load/wasteload allocations among the other sources (see Table 1 in the attachment).

The revised WLAs and LAs are shown in the errata sheet (Tables 5-9q and 5-9r).

Staff Recommendation

Adopt Resolution No. R8-2004-0037, amending Chapter 5 of the Basin Plan to incorporate the nutrient TMDLs for Lake Elsinore and Canyon Lake shown in the Attachment to the Resolution, as amended by Errata Sheet No. 1.

References

US EPA, 2000. Ambient Water Quality Criteria Recommendations. Information Supporting the Development of Sate and Tribal Nutrient Criteria: Rivers and Streams in Nutrient Ecoregion II. EPA 822-B-00-15

Binley, 2001. Patterns and Processes of Variation in Nitrogen and Phosphorus Concentrations in Forested Streams. NCASI Technical Bulletin No. 836.

Meixner T., Fenn M.E., and Wohlgemuth P.M., 2003. Fire Disturbance and Nitrogen Deposition Impacts at the Watershed Scale in Southern California.

Attachment

Table 1. Revised TMDL Allocation for Lake Elsinore and Canyon Lake to meet the revised final TP and TN targets (TP target: 0.1 mg/L, TN target: 0.75 mg/L; to be met as soon as possible but no later that 2020)

Lake Elsinore						
	Phosphorus Load Allocation (kg/yr)	Existing TP Load (kg/yr)	Reduction (%)	Nitrogen load Allocation (kg/yr)	Existing TN load (kg/yr)	Reduction (%)
TMDL	**28,584**	**48,582**	41	**239,026**	**271,206**	12
WLA	3,845	15,007		7,791	60,138	
Supplemental water*	3,721	14,883	75	7,442	59,532	87
Urban	124	124	0	349	606	42
CAFO	0	0		0	0	
LA	21,969	33,575		210,461	211,068	
Internal Sediment Source	21,554	33,160	35	197,370	197,370	0
Atmospheric Deposition	108	108	0	11,702	11,702	0
Agriculture	60	60	0	213	371	42
Open/Forest	178	178	0	567	567	0
Septics	69	69	0	608	1,058	42
Canyon Lake Watershed	2,770			20,774		
MOS	0			0		

Canyon Lake						
	Phosphorus Load Allocation (kg/yr)	Existing TP Load (kg/yr)	Reduction (%)	Nitrogen load Allocation (kg/yr)	Existing TN load (kg/yr)	Reduction (%)
TMDL	**8,691**	**13,558**	36	**37,735**	**46,124**	18
WLA	487	1,636		6,248	8,942	
Supplemental water#	48	48	0	366	366	0
Urban	306	1,142	73	3,974	5,794	31
CAFO	132	494	73	1,908	2,783	31
LA	8,204	11,922		31,487	37,182	
Internal Sediment Source	4,625	4,625	0	13,549	13,549	0
Atmospheric Deposition	221	221	0	1,918	1,918	0
Agriculture	1,183	4,414	73	7,583	11,057	31
Open/Forest	2,037	2,144	5	3,587	3,587	0
Septics	139	518	73	4,850	7,071	31
MOS	0			0		

* The existing TN and TP loads for the supplemental water only considered the recycled water. The existing load was calculated by using a volume of 6050 AFY and TP of 2 mg/L and TN of 8 mg/L.

The source of the supplemental water to Canyon Lake can be State Water Project or Colorado River Water. The average of the TP and TN concentration from the data submitted by EVMWD was used to calculate the WLA.

Comparison of Nitrogen and Phosphorus Loads from the Forest and Open Space in the SJR Watershed as Simulated by the LSPC model

and Literature Values
(From EPA nutrient Criteria for Ecoregion II, Binley, 2001, and Meixner et al., 2003)

	Existing Load				Proposed Allocation	
TN	**3586**	kg/yr	**0.027**	kg/ha/yr	1652	kg/yr
TP	**2144**	kg/yr	**0.016**	kg/ha/yr	453	kg/yr

Forest/open area i 133,336 ha

Comparison to published nitrogen export rates		Conc (mg/l)	Ave Annual Flow rate (ft^3/s)	Ave Annual Flow rate (l/s)	Mass Loading (mg/s)	Mass Loading (mg/yr)	Mass Loading (kg/yr)
N criteria, Ecosystem II	EPA	0.12	20	562	67.44	2126787840	**2126.79**
Median N conc, all U.S. forests	Binkley	0.4	20	562	224.8	7089292800	7089.29
N export (low range), control watershed on San Din	Meixner et al		20	562			
Ave N conc, all U.S. forests	Binkley	0.52	20	562	292.24	9216080640	9216.08
Median N conc, all coniferous western forests	Binkley	0.54	20	562	303.48	9570545280	9570.55
Median N conc, western forests	Binkley	0.54	20	562	303.48	9570545280	9570.55
Median N conc, all forests, igneous	Binkley	0.55	20	562	309.1	9747777600	9747.78
Ave N conc, all coniferous western forests	Binkley	0.56	20	562	314.72	9925009920	9925.01
Ave N conc, all forests, igneous	Binkley	0.62	20	562	348.44	10988403840	10988.40
Ave N conc, western forests	Binkley	0.66	20	562	370.92	11697333120	11697.33
Esimate based on measured N deposition rated in SI	Fenn		20	562			
Esimate based on measured N deposition rated in SI	Fenn		20	562			
N export (high range), control watershed on San Din	Meixner et al		20	562			

*Except where noted, all values are for the combined sum of NO3, NH4, and organic N.

Comparison to published phosphorus export rates

		Conc (mg/l)	Ave Annual Flow rate (ft^3/s)	Ave Annual Flow rate (l/s)	Mass Loading (mg/s)	Mass Loading (mg/yr)	Mass Loading (kg/yr)
P criteria, Ecosystem II	EPA	0.01	20	562	5.62	177232320	**177.23**
Median P conc, all forests, igneous	Binkley	0.045	20	562	25.29	797545440	797.55
Median P conc, western forests	Binkley	0.0475	20	562	26.695	841853520	841.85
Median P conc, all U.S. forests	Binkley	0.04875	20	562	27.3975	864007560	864.01
Median P conc, all coniferous forests	Binkley	0.04875	20	562	27.3975	864007560	864.01
Ave P conc, all forests, igneous	Binkley	0.1075	20	562	60.415	1905247440	1905.25
Ave P conc, western forests	Binkley	0.115	20	562	64.63	2038171680	2038.17
Ave P conc, all coniferous forests	Binkley	0.1175	20	562	66.035	2082479760	2082.48
Ave P conc, all U.S. forests	Binkley	0.12	20	562	67.44	2126787840	2126.79

*Includes dissolved organic P and inorganic P, plus an additional 20% assumed particulate P loading (see Binkley).

ERRATA SHEET No. 1

CHANGES TO ATTACHMENT TO RESOLUTION NO. R8-2004-0037

Language added is **underlined and bold**, language deleted is shown as ~~strike-through~~

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Table 5-9n
Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets*

Indicator	Lake Elsinore	Canyon Lake
~~Total P concentration (Interim)~~	~~**Annual average no greater than 0.1 mg/L; to be attained no later than 2015**~~	~~Annual average no greater than 0.1 mg/L; to be attained no later than 2015~~
Total P concentration (Final)	Annual average no greater than ~~0.05~~ **0.1** mg/L; to be attained no later than 2020	Annual average no greater than ~~0.05~~ **0.1** mg/L; to be attained no later than 2020
Total N concentration (Final)	Annual average no greater than 0.75 mg/L; to be attained no later than 2020	Annual average no greater than 0.75 mg/L; to be attained no later than 2020
Ammonia nitrogen concentration (Final) [Ref. #4]	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$
Chlorophyll *a* concentration (Interim)	Summer average no greater than 40 ug/L; to be attained no later than 2015	Annual average no greater than 40 ug/L; to be attained no later than 2015
Chlorophyll *a* concentration (Final)	Summer average no greater than 25 ug/L; to be attained no later than 2020	Annual average no greater than 25 ug/L; to be attained no later than 2020
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/L; to be attained no later than 2015	Minimum of 5 mg/L above thermocline; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

- compliance with targets to be achieved as soon as possible, but no later than the date specified

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Table 5-9p
Nutrient TMDLs and Compliance Dates for Lake Elsinore and Canyon Lake

TMDL	~~Interim~~ Final Total Phosphorus TMDL (kg/yr)[a, e-b]	~~Final Total Phosphorus TMDL (kg/yr)[b, e]~~	Final Total Nitrogen TMDL (kg/yr) [a, b e]
Canyon Lake	8,691	~~6,689~~	37,735
Lake Elsinore	28,584	~~12,436~~	239,025

[a] ~~Interim compliance to be achieved as soon as possible, but no later than December 31, 2015.~~
[b-a] Final compliance to be achieved as soon as possible, but no later than December 31, 2020.
[c-b] TMDL specified as 10-year running average.

Table 5-9q

Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Canyon Lake Nutrient TMDL	~~Interim~~ Final Total Phosphorus Load Allocation (kg/yr)[b,d c]	~~Final Total Phosphorus Load Allocation (kg/yr)[c, d]~~	Final Total Nitrogen Load Allocation (kg/yr)[b, c, d]
TMDL	**8,691**	**~~6,689~~**	**37,735**
WLA	~~722~~ 487	~~346~~	~~6,482~~ 6,248
Supplemental water	~~0~~ 48	~~0~~	~~248~~ 388
Urban	~~504~~ 308	~~242~~	~~4,212~~ 3,974
CAFO	~~218~~ 132	~~105~~	~~2,023~~ 1,908
LA	~~7,969~~ 8,204	~~6,343~~	~~31,253~~ 31,487
Internal Sediment	4,625	~~4,625~~	13,549
Atmospheric Deposition	221	~~221~~	1,918
Agriculture	~~1,918~~ 1,183	~~934~~	~~8,035~~ 7,983
Open/Forest	~~946~~ 2,037	~~453~~	~~2,607~~ 3,587
Septic systems	~~228~~ 139	~~109~~	~~5,140~~ 4,850

[a] The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] ~~Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.~~
[c-b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[d-c] TMDL and allocations specified as 10-year running average.

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Table 5-9r

Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Lake Elsinore Nutrient TMDL	~~Interim~~ Final Total Phosphorus Load Allocation (kg/yr)[b, d c]	~~Final Total Phosphorus Load Allocation (kg/yr)~~[c, d]	Final Total Nitrogen Load Allocation (kg/yr)[e, d , c, d]
TMDL	**28,584**	~~12,436~~	**239,025**
WLA	**3,845**	~~816~~	~~7,847~~ 7,791
Supplemental water [e d]	3,721	~~744~~	7,442
Urban	124	~~72~~	~~405~~ 349
CAFO	0	0	0
LA	**21,969**	~~10,235~~	~~210,404~~ 210,461
Internal Sediment	21,554	~~9,948~~	197,370
Atmospheric Deposition	108	~~108~~	11,702
Agriculture	60	~~35~~	~~248~~ 213
Open/Forest	178	~~104~~	~~379~~ 567
Septic systems	69	~~40~~	~~706~~ 608
CL Watershed [f c]	2,770	~~1,385~~	20,774

[a] The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.

[b] ~~Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.~~

[c b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.

[d c] TMDL and allocations specified as 10-year running average.

[e d] WLA for supplemental water should met as soon as possible as an annual average.

[f c] Allocation for Canyon Lake overflows

ERRATA SHEET No. 2

CHANGES TO ATTACHMENT TO RESOLUTION NO. R8-2004-0037

Language added is **underlined and bold**, language deleted is shown as ~~strike-through~~

Table 5-9q

Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Canyon Lake Nutrient TMDL	Final Total Phosphorus Load Allocation (kg/yr)[b, c]	Final Total Nitrogen Load Allocation (kg/yr)[b, c]
TMDL	**8,691**	**37,735**
WLA	487	6,248
Supplemental water	48	~~388~~ **366**
Urban	~~308~~ **306**	3,974
CAFO	132	1,908
LA	**8,204**	**31,487**
Internal Sediment	4,625	13,549
Atmospheric Deposition	221	1,918
Agriculture	1,183	~~7,983~~ **7,583**
Open/Forest	2,037	3,587
Septic systems	139	4,850

[a] The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[c] TMDL and allocations specified as 10-year running average.

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Table 5-9r

Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Lake Elsinore Nutrient TMDL	Final Total Phosphorus Load Allocation (kg/yr)[b, c]	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**28,584**	**239,025**
WLA	3,845	7,791
Supplemental water [d]	3,721	7,442
Urban	124	349
CAFO	0	0
LA	**21,969**	**210,461**
Internal Sediment	21,554	197,370
Atmospheric Deposition	108	11,702
Agriculture	60	213
Open/Forest	178	567
Septic systems	69	608
CL Watershed [e]	2,770	20,774

[a] The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.
[b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[c] TMDL and allocations specified as 10-year running average.
[d] WLA for supplemental water should met as soon as possible as ~~an annual~~ **a 5 year running** average.
[e] Allocation for Canyon Lake overflows

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Task 2.6:

2.6 Waste Discharge Requirements for US Air Force, March Air Reserve Base, Storm Water Runoff, Riverside County, Order No. ~~99-6~~**R8-2004-0033**, NPDES CA 00111007

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Task 7: Urban Discharges

Urban discharges**.** including stormwater runoff, ~~includes~~ **are** those from the cities and unincorporated communities in the San Jacinto River watershed. These discharges are regulated under the Riverside County MS4 NPDES permit**, the San Jacinto Watershed Construction Activities Storm Water permit, the State Board's General Permit for Storm Water Runoff from Construction Activities, and the State Board's General Permit for Storm Water Runoff from Industrial Activities**. Nuisance and stormwater runoff from state highways and right of ways is regulated under the State of California, Department of Transportation (Caltrans) statewide general NPDES permit. Finally, nuisance and stormwater runoff from the March Air Reserve Base is also regulated through an NPDES permit.

7.1 Revision to the Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. By August 1, 2006, the permittees shall review and revise the DAMP **and or WQMP (see 7.2 below)** as necessary to address the requirements of these nutrient TMDLs. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the interim and final nutrient wasteload allocations. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The ~~co-permittees~~ **revised DAMP/WQMP** shall also ~~provide~~ **include** a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocation for urban runoff. The proposal must be implemented upon **approval by the** Regional Board ~~approval at a duly noticed public meeting~~ **after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period**.

7.2 Revision of the Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to develop and submit a WQMP by June 2004 for ~~the Executive Officer's~~ approval**. On September 17, 2004, the Board approved a WQMP developed by the permittees. The approved WQMP includes source control BMPs, design BMPs and treatment control BMPs. Further revisions to the WQMP and/or the DAMP may be necessary to meet the WLA for urban runoff.** By August 1, 2006, the permittees shall submit a revised WQMP **and/or revised DAMP (see 7.1 above)** that addresses the nutrient input from new developments and significant redevelopments to assure compliance with the nutrient wasteload allocations for urban runoff. The WQMP shall also address requirements currently in Order No. 01-34 (see 2.2, above). Once the WQMP is approved, Order No. 01-34 ~~will~~ **may** be rescinded. Further review and revision of the WQMP necessary to assure

that TMDL requirements are addressed shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

7.3 Revision of the State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. By April 1, 2006, Caltrans shall submit a Regional Workplan that includes plans and schedules for meeting the interim and final nutrient wasteload allocations, and provides a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocations for urban runoff , which includes runoff from Caltrans facilities. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The proposal shall be implemented upon the Executive Officer's approval. Annual updates to the Regional Workplan shall include, as necessary, revised plans and schedules for meeting the interim and final nutrient wasteload allocations and revised proposals for evaluating the efficacy of control actions and compliance with the nutrient wasteload allocations.

7.4 Revision to the United States Air Force, March Air Reserve Base, Stormwater Permit

Order No. ~~99-6~~ **R8-2004-0033** specifies monitoring and report**ing** requirements for stormwater runoff from the US Air Force, March Air Reserve facility. **Provision C.17 indicates that the order could be reopened to incorporate TMDL requirements.** Provision**s** **C.18.a** ~~B.11.a~~ and **C.18.b**~~B.11.b~~ require~~s~~ that March Air Reserve Base submit a report and revise the Stormwater Pollution Prevention Plan (SWPPP) to address any pollutants that may be causing or contributing to exceedances of water quality standards. Results from the TMDL nutrient monitoring program conducted pursuant to Task 3, shall serve as the basis for revision of the SWPPP **and/or reopening the order**.

Development of the Municipal permittee's WQMP and revisions to their DAMP, development of the Caltrans SWMP and Regional Workplan, and Revision to the March Air Reserve Base SWPPP, shall address the urban component of the nutrient TMDL.

Compliance with the urban wasteload allocation may be achieved through a Regional Board approved pollutant trading program.

California Regional Water Quality Control Board
Santa Ana Region

December 17, 2004

Item: 16

Subject: Public Hearing: Consideration of Adoption of Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake – Resolution No. R8-2004-0037

DISCUSSION

On May 21, 2004, staff of the California Regional Water Quality Control Board, Santa Ana Region (Regional Board) issued a staff report entitled "Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads". The report proposed that the Regional Board consider amendment of the Implementation Plan of the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) to incorporate the proposed TMDLs, which require actions to reduce nutrient discharges to Lake Elsinore and Canyon Lake.

On June 4, 2004, the Regional Board held the first public workshop to receive evidence and testimony on the proposed Lake Elsinore and Canyon Lake Total Maximum Daily Loads (TMDLs). Based on both written and oral comments received from the public, staff revised the proposed TMDLs and responded to comments received prior to, during and after the June 4, 2004 public workshop.

On September 17, 2004, the Regional Board conducted a second public workshop to receive further testimony on the revised TMDLs. Staff revised the Basin Plan Amendment language (Attachment to Tentative Resolution No. R8-2004-0037), and prepared responses to the written and oral comments received. The staff responses to comments received during and after the September 17, 2004 public workshop are included in Attachment B. Attachment C contains the CEQA checklist. Copies of the written comments are included in Attachment D.

In summary, the proposed TMDLs include:

- Interim and final numeric targets;
- Wasteload Allocations (WLAs) for point source discharges and Load Allocations (LAs) for nonpoint source discharges;
- An Implementation plan and schedules for compliance with the TMDLs, numeric targets, WLAs and LAs; and,
- A monitoring plan and schedule to assess the effectiveness of the TMDLs.

In response to comments by the stakeholders, particularly Riverside County Flood Control and Water Conservation District, staff acknowledges that the science supporting the interim and final TMDL numeric targets for total phosphorous and the final TMDL numeric target for total nitrogen (collectively, the numeric targets) specified in the proposed BPA is preliminary. Where science was lacking, Staff selected numeric target values conservatively for nutrients. Staff believes that it is feasible to achieve the interim TMDL targets, however, compliance with the final

TMDLs is more problematic and will require collaboration among the stakeholders and identification and implementation of creative pollutant control and trading measures.

Based on the comments received on the proposed nutrient TMDLs, staff proposes the following major changes to the TMDLs/Basin Plan Amendment.

Addition of Task 3. Identify Agricultural Operators
Comments were received concerning the organizational structure for the stakeholders to work together to implement the TMDLs. It was suggested that he Regional Board should facilitate the TMDL implementation organizational effort by clearly identifying all responsible parties, specifically agricultural operators (Attachment B, Comment 12, 24).

In response, Staff recommends the addition of a new task (new Task 3) in Section E. TMDL Implementation, that specifies that the Regional Board will identify agricultural operators within one month after the Basin Plan Amendment receives final approval from the US EPA.

Revisions to compliance dates for certain dischargers
Based on comments received (Attachment B, Comment 14), staff proposes to modify the compliance dates for proposed implementation plan requirements for the Lake Elsinore in-lake sediment nutrient reduction plan (Section E. TMDL Implementation, Task 10, previous Task 9), the Canyon Lake in-lake sediment treatment evaluation (Task 11, previous Task 10), and the watershed and Canyon Lake and Lake Elsinore In-lake Model updates (Task 12, previous Task 11). Revision of these compliance dates would allow additional time for the responsible parties to develop appropriate plans, develop agreements, work within their fiscal budgeting process, etc. These revised compliance dates are shown in Table 5-9s in Attachment A to Tentative Resolution No. R8-2004-0037.

Monitoring Program Requirements – Flexibility Language Added
It was recommended (Attachment B, Comment 14) that the schedule for Task 4 (submittal of watershed-wide, Lake Elsinore and Canyon Lake nutrient monitoring plans) be extended by one year to allow for the stakeholders to work together to establish an organizational structural, secure funds and hire consultants to prepare the plans. Staff believes that a delay of one year is not warranted and would result in unacceptable gaps in data collection. Staff recommends that the proposed amendment be revised to require that initial monitoring plans/schedules that satisfy the minimum monitoring requirements specified in Task 4.1.,4.2 and 4.3 be submitted no later than 3 months from approval of the BPA, and that revised plans/schedules, if necessary, be submitted no later than 15 months after BPA approval.

Additional Cost Information Associated with the Implementation of the Nutrient TMDLs for Lake Elsinore and Canyon Lake

Additional comments were received from Riverside County Flood Control and Water Conservation District concerning the economic implications of the proposed TMDLs (Attachment B, Comment 21). As shown in Attachment B, Staff has responded to these comments in detail. The additional cost information provided by the District is presented below.

Cost Estimates (provided by the Riverside County Flood Control and Water Conservation District)

Based on the EPA's Urban Nutrient Reduction BMP Costs (1999) referenced in the Regional Board Staff Report, the following table estimates the costs associated with the construction of nutrient reduction BMPs in the San Jacinto River Watershed to address the wet year flow volume (139,345 ac ft or approximately 6 billion cubic feet). These cost estimates presume that each stakeholder in the watershed tributary to Canyon Lake would implement the specified BMP. Urban Stakeholder BMP costs, based on a rough estimation of land use (both urban areas and non-urban areas tributary to urban systems) and runoff rates, could represent between 50-60% of the total cost identified below:

BMP Construction Costs to Treat Wet Year Flow

BMP	**EPA, 2003 $s** (per ft^3 treated)	**Cost, 2003 $s** ($V_{wet}$ = 6 Billion ft^3)
Constructed Wetland	$0.60 - $1.13	$ 3.6 B – $ 6.78 B
Infiltration Trench	$4.00	$ 24 B
Infiltration Basin	$1.18	$ 7.08 B
Sand Filter	$2.72 - $5.96	$ 16.3 B – $ 35.7 B
Bioretention	$4.79	$ 28.7 B
Retention & Detention Basin	$0.45 - $0.90	$ 2.7 B – $ 5.4 B
Grass Swale	$0.45	$ 2.7 B
Filter Strip	$0.00 - $1.18	$0 – $ 7.1 B

In addition, costs are provided for BMPs to treat moderate year events:

BMP Construction Costs to Treat Moderate Year Flow

BMP	**EPA, 2003 $s** (per ft^3 treated)	**Cost, 2003 $s** ($V_{mod}$ = 253 M ft^3)
Constructed Wetland	$0.60 - $1.13	$ 152 M – $ 286 M
Infiltration Trench	$4.00	$ 1,000 M
Infiltration Basin	$1.18	$ 299 M
Sand Filter	$2.72 - $5.96	$ 688 M – $ 1,500 M
Bioretention	$4.79	$ 1,200 M
Retention & Detention Basin	$0.45 - $0.90	$ 114 M – $ 228 M
Grass Swale	$0.45	$ 114 M
Filter Strip	$0.00 - $1.18	$0 – $ 299 M

The above tables do not include land acquisition, design, geotechnical testing, legal fees, and other unexpected or additional costs, such as maintenance and operation of each BMP. It should be noted that in the arid climate of the San Jacinto River Watershed, BMPs such as constructed wetlands, grass swales and filter strips would require a reliable year-round supply of water, aside from storm and urban runoff, in order to operate.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REQUIREMENTS

The basin planning process has been certified by the Secretary of Resources as functionally equivalent to the requirement for the preparation of an Environmental Impact report or Negative Declaration. The Regional Board is required to complete an environmental assessment of any changes the Board proposes to make to the Basin Plan. Staff prepared an Environmental Checklist (Attachment B to the May 2004 TMDL Report and Attachment C to the September 17, 2004 staff report), determining that there would be no significant adverse environmental impacts from the proposed Basin Plan Amendment. Staff has reviewed the environmental checklist in light of the proposed changes to the Basin Plan amendment/TMDL discussed above. No changes to the environmental checklist are warranted; the staff determination that there would be no adverse environmental impacts from the proposed amendment remain valid.

RECOMMENDATION:

Adopt Resolution No. R8-2004-0037, amending Chapter 5 of the Basin Plan to incorporate the nutrient TMDLs for Lake Elsinore and Canyon Lake shown in the Attachment to the Resolution.

ATTACHMENT A

California Regional Water Quality Control Board
Santa Ana Region

RESOLUTION NO. R8-2004-0037

Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate Nutrient Total Maximum Daily Loads (TMDLs) for Lake Elsinore and Canyon Lake

Tentative

WHEREAS, the California Regional Water Quality Control Board, Santa Ana Region (hereinafter, Regional Board), finds that:

1. An updated Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) was adopted by the Regional Board on March 11, 1994, approved by the State Water Resources Control Board (SWRCB) on July 21, 1994, and approved by the Office of Administrative Law (OAL) on January 24, 1995.

2. The Basin Plan specifies the following beneficial uses for Lake Elsinore: warm freshwater aquatic habitat (WARM), body contact recreation (REC1), non-body contact recreation (REC2) and wildlife habitat (WILD).

3. The Basin Plan specifies the following beneficial uses for Canyon Lake: warm freshwater aquatic habitat (WARM), body contact recreation (REC1), non-body contact recreation (REC2), wildlife habitat (WILD), municipal and domestic water supply (MUN), agriculture water supply (AGR) and groundwater recharge (GWR).

4. The Basin Plan specifies the narrative water quality objective for algae for inland surface waters, including Lake Elsinore and Canyon Lake, that waste discharges shall not contribute to excessive algae growth in receiving waters.

5. For WARM designated inland surface waters, the Basin Plan specifies the narrative objective that dissolved oxygen levels shall not be depressed below 5 mg/L.

6. The narrative water quality objectives pertaining to excessive algae growth and dissolved oxygen are not being met in Lake Elsinore, as demonstrated by a history of significant algae blooms and low dissolved oxygen concentrations. Lake Elsinore beneficial uses adversely impacted include WARM, WILD, REC1 and REC2.

7. The narrative objectives pertaining to excessive algae growth and dissolved oxygen are not being met in Canyon Lake, as demonstrated by occasional excessive algae growth, and by low dissolved oxygen concentrations. Canyon Lake beneficial uses adversely impacted include MUN, WARM, WILD, REC1 and REC2.

8. As a result of the beneficial use impacts to the two lakes, the Regional Board listed Lake Elsinore and Canyon Lake as water quality limited in accordance with Section 303(d) of the Clean Water Act. Section 303(d) requires the establishment of a Total Maximum Daily Load (TMDL) for the pollutant(s) causing the impairment. Phosphorus

and nitrogen are the nutrients causing the impairment. Section 303(d) also requires the allocation of the TMDL among the sources of nutrient inputs. State law requires an implementation plan and schedule to ensure that the TMDL is met and that compliance with water quality standards is achieved.

9. The Basin Plan amendment shown in the attachment to this Resolution was developed in accordance with Clean Water Act Section 303(d) and Water Code Section 13240 *et seq*. The amendment is proposed for incorporation into Chapter 5 "Implementation", of the Basin Plan. The proposed Basin Plan amendment includes background information concerning the water quality impairment being addressed, and the sources of nutrients to Canyon Lake and Lake Elsinore. The proposed TMDL is supported by a detailed report prepared by Regional Board staff and titled "Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads", June 2004 (hereinafter, "TMDL Report").

10. The Basin Plan amendment specifies interim and final numeric targets for total phosphorus for both Lake Elsinore and Canyon Lake, and final numeric targets for total nitrogen for both lakes. Control of nitrogen and phosphorus is needed to ensure compliance with relevant numeric and narrative water quality objectives specified in the Basin Plan, including those pertaining to excessive algae growth and dissolved oxygen.

11. The Basin Plan amendment specifies interim and final response numeric targets for chlorophyll *a* and dissolved oxygen for both Lake Elsinore and Canyon Lake. These response numeric targets provide a method to track improvements in water quality resulting from reduction in the loading of nitrogen and phosphorus.

12. The Basin Plan amendment specifies interim and final TMDLs, wasteload allocations for point source discharges (WLA), load allocations for nonpoint source discharges (LA) for total phosphorus for Lake Elsinore and Canyon Lake. The Basin Plan amendment specifies final TMDLs, wasteload allocations for point source discharges and load allocations for nonpoint source discharges for total nitrogen for both lakes.

13. The Basin Plan amendment specifies an implementation plan for nutrient reduction. The implementation plan includes compliance schedules for the numeric targets, TMDLs, wasteload allocations and load allocations, as well as a monitoring program to track progress toward compliance.

14. The Basin Plan amendment will assure the reasonable protection of the beneficial uses of surface waters within the Region and is consistent with the state's antidegradation policy (SWRCB Resolution No. 68-16).

15. The Regional Board has considered the costs associated with implementation of this amendment, as well as costs resulting from failure to implement nutrient control measures necessary to prevent adverse effects on beneficial uses. The implementation plan in the Basin Plan, which includes extended compliance schedules and employs a phased TMDL approach to provide for refinement based on additional studies and analyses, will ensure that implementation expenditures are reasonable and fairly apportioned among responsible parties.

16. The proposed amendment results in no potential for adverse effects, either individually or cumulatively, on fish and/or wildlife species.

17. The adoption of these TMDLs is necessary to reduce loadings of nutrients to Lake Elsinore and Canyon Lake and to address water quality impairments that arise therefrom.

18. The proposed amendment meets the "Necessity" standard of the Administrative Procedure Act, Government Code, Section 11352, subdivision (b).

19. The Regional Board submitted the relevant technical documents that serve as the basis for the proposed amendment to an external scientific review panel and has considered the comments and recommendations of that panel in drafting the amendment.

20. The proposed amendment will result in revisions to the Basin Plan Chapter 5 "Implementation".

21. The Regional Board discussed this matter at a workshops conducted on June 4, 2004 and September 17, 2004 after notice was given to all interested persons in accordance with Section 13244 of the California Water Code. Based on the discussion at those workshops, the Board directed staff to prepare the appropriate Basin Plan amendment and related documentation to incorporate the Lake Elsinore and Canyon Lake Nutrient TMDLs.

22. The Regional Board prepared and distributed written reports (staff reports) regarding adoption of the Basin Plan amendment in accordance with applicable state and federal environmental regulations (California Code of Regulations, Section 3775, Title 23, and 40 CFR Parts 25 and 131).

23. The process of basin planning has been certified by the Secretary for Resources as exempt from the requirement of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) to prepare an Environmental Impact Report or Negative Declaration. The Basin Plan amendment package includes staff reports, an Environmental Checklist, an assessment of the potential environmental impacts of the Basin Plan amendment, and a discussion of alternatives. The Basin Plan amendment, Environmental Checklist, staff reports, and supporting documentation are functionally equivalent to an Environmental Impact Report or Negative Declaration.

24. On December 17, 2004, the Regional Board held a Public Hearing to consider the Basin Plan amendment. Notice of the Public Hearing was given to all interested persons and published in accordance with Water Code Section 13244.

25. The Basin Plan amendment must be submitted for review and approval by the State Water Resources Control Board (SWRCB), Office of Administrative Law (OAL) and U.S. Environmental Protection Agency (USEPA). Once approved by the SWRCB, the amendment is submitted to OAL and USEPA. The Basin Plan amendment will become effective upon approval by OAL and USEPA. A Notice of Decision will be filed.

26. The Notice of Filing, the TMDL Report, environmental checklist, and the draft amendment were prepared and distributed to interested individuals and public agencies for review and comment, in accordance with state and federal regulations (23 CCR §3775, 40 CFR 25 and 40 CFR 131).

27. For the purposes of specifying compliance schedules in NPDES permits for effluent limitations necessary to implement these TMDLs, the schedule(s) specified in these TMDLs shall govern, notwithstanding other compliance schedule authorization language in the Basin Plan.

NOW, THEREFORE BE IT RESOLVED THAT:

1. The Regional Board adopts the amendment to the Water Quality Control Plan for the Santa Ana River Basin (Region 8), as set forth in the attachment.

2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the SWRCB in accordance with the requirements of Section §13245 of the California Water Code.

3. The Regional Board requests that the SWRCB approve the Basin Plan amendment, in accordance with Sections §13245 and §13246 of the California Water Code, and forward it to the OAL and U.S. EPA for approval.

4. If, during its approval process, the SWRCB or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Board of any such changes.

5. The Executive Officer is authorized to sign a Certificate of Fee Exemption in lieu of payment of the California Department of Fish and Game filing fee.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on December 17, 2004.

_____

Gerard J. Thibeault
Executive Officer

ATTACHMENT TO RESOLUTION NO. R8-2004-0037

(Changes to the September 2004 version of the proposed Basin Plan amendment are shown as ~~strikeout~~ for deletions and underline for additions)

Amendment to the Santa Ana Region Basin Plan

Chapter 5 - Implementation Plan
(NOTE: The following language is proposed to be inserted into Chapter 5 of the Basin Plan. If the amendments are approved, corresponding changes will be made to the Table of Contents, the List of Tables, page numbers, and page headers in the plan. Due to the two-column page layout of the Basin Plan, the location of tables in relation to text may change during final formatting of the amendments. For formatting purposes, the maps may be redrawn for inclusion in the Basin Plan, and the final layout may differ from that of the draft.)

Lake Elsinore/San Jacinto River Watershed

The Lake Elsinore/San Jacinto River Watershed is located in Riverside County and includes the following major waterbodies: Lake Hemet, San Jacinto River, Salt Creek, Canyon Lake and Lake Elsinore. The total drainage area of the San Jacinto River watershed is approximately 782 square miles. Over 90 percent of the watershed (735 square miles) drains into Canyon Lake. Lake Elsinore is the terminus of the San Jacinto River watershed. The local tributary area to Lake Elsinore, consisting of drainage from the Santa Ana Mountains and the City of Lake Elsinore, is 47 square miles.

Land use in the watershed includes open/forested, agricultural (including concentrated animal feeding operations such as dairies and chicken ranches, and irrigated cropland), and urban uses, including residential, industrial and commercial. Vacant/open space is being converted to residential uses as the population in the area expands. The municipalities in the watershed include the cities of San Jacinto, Hemet, Perris, Canyon Lake, Lake Elsinore and portions of Moreno Valley and Beaumont.

1. Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Load (TMDL)

Lake Elsinore and Canyon Lake are not attaining water quality standards due to excessive nutrients (nitrogen and phosphorus). Reports prepared by Regional Board staff describe the impact nutrient discharges have on the beneficial uses of Lake Elsinore and Canyon Lake [Ref. #1, 2] Lake Elsinore was formed in a geologically active graben area and has been in existence for thousands of years. Due to the mediterranean climate and watershed hydrology, fluctuations in the level of Lake Elsinore have been extreme, with alternate periods of a dry lake bed and extreme flooding. These drought/flood cycles have a great impact on lake water quality. Fish kills and excessive algae blooms have been reported in Lake Elsinore since the early 20th century. As a result, in 1994, the Regional Board placed Lake Elsinore on the 303(d) list of impaired waters due to excessive levels of nutrients and organic enrichment/low dissolved oxygen.

Canyon Lake, located approximately ~~2~~ 5 miles upstream of Lake Elsinore, was formed by the construction of Railroad Canyon Dam in 1928. Approximately 735 square miles of the 782 square mile San Jacinto River watershed drain to Canyon Lake. During most years, runoff from the watershed terminates at Canyon Lake without reaching Lake Elsinore, resulting in the buildup of nutrients in Canyon Lake. While Canyon Lake does not have as severe an eutrophication problem as Lake Elsinore, there have been periods of algal blooms and anecdotal reports of occasional fish kills. Accordingly, in

1998, the Regional Board added Canyon Lake to the 303(d) list of impaired waters due to excessive levels of nutrients.

A TMDL technical report prepared by Regional Board staff describes the nutrient related problems in Canyon Lake and Lake Elsinore in greater detail and discusses the technical basis for the TMDLs that follow [Ref. # 3].

A. Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets

Numeric targets for Lake Elsinore and Canyon Lake are based on reference conditions when beneficial uses in the lakes were not significantly impacted by nutrients. Table 5-9n shows both "causal" and "response" interim and final numeric targets for both lakes. Causal targets are those for phosphorus and nitrogen. Phosphorus and nitrogen are the primary limiting nutrients in Lake Elsinore and Canyon Lake, respectively. However, under certain conditions, nitrogen may be limiting in Lake Elsinore and phosphorus may be limiting in Canyon Lake. Targets for both nutrients are therefore necessary . Reduction in nitrogen inputs will be necessary over the long-term and only final targets are specified. Response targets include chlorophyll *a* and dissolved oxygen. These targets are specified to assess water quality improvements in the lakes. Finally, ammonia targets are specified to prevent un-ionized ammonia toxicity to aquatic life.

Table 5-9n
Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets*

Indicator	Lake Elsinore	Canyon Lake
Total P concentration (Interim)	Annual average no greater than 0.1 mg/L; to be attained no later than 2015	Annual average no greater than 0.1 mg/L; to be attained no later than 2015
Total P concentration (Final)	Annual average no greater than 0.05 mg/L; to be attained no later than 2020	Annual average no greater than 0.05 mg/L; to be attained no later than 2020
Total N concentration (Final)	Annual average no greater than 0.75 mg/L; to be attained no later than 2020	Annual average no greater than 0.75 mg/L; to be attained no later than 2020
Ammonia nitrogen concentration (Final) [Ref. #4]	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$
Chlorophyll *a* concentration (Interim)	Summer average no greater than 40 ug/L; to be attained no later than 2015	Annual average no greater than 40 ug/L; to be attained no later than 2015
Chlorophyll *a* concentration (Final)	Summer average no greater than 25 ug/L; to be attained no later than 2020	Annual average no greater than 25 ug/L; to be attained no later than 2020
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/L; to be attained no later than 2015	Minimum of 5 mg/L above thermocline; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

* compliance with targets to be achieved as soon as possible, but no later than the date specified

B. Lake Elsinore and Canyon Lake Nutrient TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL report, nutrient loading to Canyon Lake and Lake Elsinore varies depending on the hydrologic conditions that occur in the San Jacinto watershed. As part of the TMDL analysis and development, three hydrologic scenarios and the relative frequency of each of these conditions (based upon an 87 year record of flow data at the USGS Gauging station downstream of Canyon Lake), were identified as shown in Table 5-9o. The resulting TMDLs, wasteload allocations and load allocations are based on 10-year running flow weighted average nutrient loads, taking into account the frequency of the three hydrologic conditions and the nutrient loads associated with each of them. Phosphorus and nitrogen TMDLs for Canyon Lake and Lake Elsinore are shown in Table 5-9p. The TMDLs, expressed as 10–year running averages, will implement the numeric targets and thereby attain water quality standards,. Phosphorus and nitrogen wasteload allocations for point source discharges and load allocations for nonpoint source discharges, also expressed as 10-year running averages, are shown in Tables 5-9q and 5-9r. No TMDLs, wasteload allocations or load allocations are specified for chlorophyll a, dissolved oxygen or ammonia. Chlorophyll a and dissolved oxygen targets are intended to serve as measures of the effectiveness of phosphorus and nitrogen reductions implemented to meet TMDL requirements. Until ammonia transformations, and nitrogen dynamics in general, are better understood, no ammonia TMDLs, wasteload allocations or load allocations are specified.

Table 5-9o
San Jacinto River Hydrologic Conditions with Relative Flow Frequency at the USGS Gauging Station Downstream of Canyon Lake (Station No. 1170500)

Hydrologic Condition	Representative Water Year	Years of Hydrologic Condition	Relative Frequency (%)	Description
Wet	1998	14	16	Both Canyon Lake and Mystic Lake overflow; flow at the USGS gauging station 11070500 17,000 AF or greater
Moderate	1994	36	41	No Mystic Lake overflow; Canyon Lake overflowed; flow at the USGS gauging station 11070500 less than 17,000 AF and greater than 271 AF
Dry	2000	37	43	No overflows from Mystic Lake or Canyon Lake; flow at the USGS gauging station 11070500 371 AF or less

Table 5-9p
Nutrient TMDLs and Compliance Dates for Lake Elsinore and Canyon Lake

TMDL	Interim Total Phosphorus TMDL (kg/yr)[a, c]	Final Total Phosphorus TMDL (kg/yr)[b, c]	Final Total Nitrogen TMDL (kg/yr)[b, c]
Canyon Lake	8,691	6,689	37,735
Lake Elsinore	28,584	12,436	239,025

[a] Interim compliance to be achieved as soon as possible, but no later than December 31, 2015.
[b] Final compliance to be achieved as soon as possible, but no later than December 31, 2020.
[C] TMDL specified as 10-year running average.

Table 5-9q

Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Canyon Lake Nutrient TMDL	Interim Total Phosphorus Load Allocation (kg/yr)[b, d]	Final Total Phosphorus Load Allocation (kg/yr)[c, d]	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**8,691**	**6,689**	**37,735**
WLA	**722**	**346**	**6,482**
Supplemental water	0	0	248
Urban	504	242	4,212
CAFO	218	105	2,023
LA	**7,969**	**6,343**	**31,253**
Internal Sediment	4,625	4,625	13,549
Atmospheric Deposition	221	221	1,918
Agriculture	1,948	934	8,035
Open/Forest	946	453	2,607
Septic systems	228	109	5,140

[a] The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.
[c] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[d] TMDL and allocations specified as 10-year running average.

Table 5-9r

Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Lake Elsinore Nutrient TMDL	Interim Total Phosphorus Load Allocation (kg/yr)[b, d]	Final Total Phosphorus Load Allocation (kg/yr)[c, d]	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**28,584**	**12,436**	**239,025**
WLA	**3,845**	**816**	**7,847**
Supplemental water[e]	3,721	744	7,442
Urban	124	72	405
CAFO	0	0	0
LA	**21,969**	**10,235**	**210,404**
Internal Sediment	21,554	9,948	197,370
Atmospheric Deposition	108	108	11,702
Agriculture	60	35	248
Open/Forest	178	104	379
Septic systems	69	40	706
CL Watershed[ef]	2,770	1,385	20,774

[a] The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.
[b] Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.
[c] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[d] TMDL and allocations specified as 10-year running average.
[e] WLA for supplemental water should met as soon as possible as an annual average.
[f] Allocation for Canyon Lake overflows

The TMDL distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources, where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost-effective way to achieve pollution reduction benefits. (See Section E. TMDL Implementation, Task 11, below).

C. Margin of Safety

The Canyon Lake and Lake Elsinore Nutrient TMDLs include an implicit margin of safety (MOS) as follows:

- the derivation of numeric targets based on the 25th percentile of data for ~~both lakes~~ Lake Elsinore; Canyon Lake numeric targets are consistent with the Lake Elsinore targets;
- the use of multiple numeric targets to measure attainment of beneficial uses and thereby assure TMDL efficacy;
- the use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
- the use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
- requiring load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

D. Seasonal Variations/Critical Conditions

The Canyon Lake and Lake Elsinore Nutrient TMDLs account for seasonal and annual variations in external and internal nutrient loading and associated impacts on beneficial uses by the use of a 10-year running average allocation approach. This 10-year running average approach addresses variation in hydrologic conditions (wet, moderate and dry) that can dramatically affect both nutrient loading and lake response.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

E. TMDL Implementation

Typically, under dry and moderate conditions, the internal nutrient loading drives the nutrient dynamics in both Canyon Lake and Lake Elsinore. However, it is the extreme (albeit infrequent) loading that occurs during wet conditions that provides the nutrients to the lakes that remain in the lakes as internal nutrient sources in subsequent years. Given the complexity of the San Jacinto River watershed hydrology, control of nutrients input to the lakes is needed for all hydrologic conditions. Collection of additional monitoring data is critical to developing long-term solutions for nutrient control. With that in mind, the submittal of plans and schedules to implement the TMDLs should take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 5-9s is expected to achieve compliance with water quality standards. Each of these tasks is described below.

Table 5-9s

Lake Elsinore and Canyon Lake Nutrient TMDL Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
Task 1	Establish New Waste Discharge Requirements	*(*6 months after BPA approval*)*
Task 2	Revise Existing Waste Discharge Permits	*(*6 months after BPA approval*)*
Task 3	Identify Agricultural Operators	*(*1 month after BPA approval*)*
Task ~~3~~4	~~Watershed-wide~~ Nutrient Water Quality Monitoring Program ~~3~~4.1 Watershed-wide Nutrient Monitoring Plan(s) ~~3~~4.2 Lake Elsinore Nutrient Monitoring Plan(s) ~~3~~4.3 Canyon Lake Nutrient Monitoring Plan(s)	• Initial p~~P~~lan/schedule due *(*3 months after BPA approval*)* • Annual reports due August 15 • Revised plan/schedule due *(*15 months after BPA approval*)*
Task ~~4~~5	Agricultural Discharges – Nutrient Management Plan	Plan/schedule due *(*2 years after BPA approval*)*
Task ~~5~~6	On-site Disposal Systems (Septic Systems) Management Plan	Dependent on State Board approval of relevant regulations (see text).
Task ~~6~~7	Urban Discharges ~~6~~7.1 Revision of Drainage Area Management Plan (DAMP) ~~6~~7.2 Revision of the Water Quality Management Plan (WQMP) ~~6~~7.3 Update of the Caltrans Stormwater Management Plan and Regional Plan ~~6~~7.4 Update of US Air Force, March Air Reserve Base SWPPP	Plan/schedule due: ~~6~~7.1 August 1, 2006 ~~6~~7.2 August 1, 2006 ~~6~~7.3 April 1, 2006 ~~6~~7.4 Dependent on Task 3 results. See text.
Task ~~7~~8	Forest Area – Review/Revision of Forest Service Management Plans	Plan/schedule due *(*2 years after BPA approval*)*
Task ~~8~~9	Lake Elsinore ~~Lake~~ In-Lake Sediment Nutrient Reduction Plan	Plan/schedule due *(*~~6~~18 months after BPA approval)**
Task ~~9~~10	Canyon Lake In-Lake Sediment Treatment Evaluation	Plan/schedule due *(*~~6~~18 months after BPA approval*)*
Task ~~10~~11	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	Plan/schedule due *(*~~6~~18 months after BPA approval*)*
Task ~~11~~12	Pollutant Trading Plan	Plan/schedule due *(*2 years after BPA approval*)*
Task ~~12~~13	Review and Revise Nutrient Water Quality Objectives	December 31, 2009
Task ~~13~~14	Review of TMDL/WLA/LA	Once every 3 years to coincide with the Regional Board's triennial review

[Note: BPA => Basin Plan Amendment]

Task 1: Establish New Waste Discharge Requirements

On or before (**6 months from the effective date of this BPA*), the Regional Board shall issue new waste discharge requirements (NPDES permit) to Elsinore Valley Municipal Water District for supplemental water discharges to Canyon Lake that incorporate the appropriate interim and final wasteload allocations, compliance schedule and monitoring program requirements.

Other proposed nutrient discharges will be addressed and permitted as appropriate.

Task 2: Review and/or Revise Existing Waste Discharge Requirements

There are five Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the San Jacinto watershed. On or before (**6 months from the effective date of this Basin Plan amendment**), each of these WDRs shall be reviewed and revised as necessary to implement the Lake Elsinore and Canyon Lake Nutrient TMDLs, including the appropriate nitrogen and phosphorus interim and final wasteload allocations, compliance schedules and/or monitoring program requirements.

2.1 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 6.1, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

2.2 Watershed-Wide Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with New Developments in the San Jacinto Watershed, Order No. 01-34, NPDES No. CAG 618005. It is expected that this Order will be rescinded once the Regional Board/Executive Officer approves a Water Quality Management WQMP) under Order No. R8-2002-0011 (see 2.1, above and Task 6.2, below)

2.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11).

2.4 Waste Discharge and Producer/User Reclamation Requirements for the Elsinore Valley Municipal Water District, Regional Water Reclamation Facility Riverside County, Order No. 00-1, NPDES No. CA8000027. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.5 Waste Discharge Requirements for Eastern Municipal Water District, Regional Water Reclamation System, Riverside County, Order No. 99-5, NPDES No. CA8000188[1]. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.6 Waste Discharge Requirements for US Air Force, March Air Reserve Base, Storm Water Runoff, Riverside County, Order No. 99-6, NPDES CA 00111007

[1] Contingent on Eastern Municipal Water District discharge of recycled water to Lake Elsinore.

Task 3: Identify Agricultural Operators

On or before (*1 *month from the effective date of this BPA*), the Regional Board shall develop a list of all known agricultural operators in the San Jacinto watershed that will be responsible for implementing requirements of this TMDL. The Regional Board will send a notice to these operators informing them of their TMDL responsibility and alerting them to the potential regulatory consequences of failure to comply.

Task 43: Monitoring

No later than (*3 *months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval proposed monitoring program as required by Tasks 4.1, 4.2 and 4.3.

If modifications to the monitoring program are warranted, no later than (*15 *months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a revised proposed Watershed nutrient monitoring program (Task 4.1), Lake Elsinore monitoring program (Task 4.2) and Canyon Lake nutrient monitoring program (Task 4.3).

In lieu of these coordinated monitoring plans, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval to address the requirements of Tasks 4.1, 4.2 and 4.3. Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment**). If needed, revisions to any individual or group monitoring plan shall be submitted no later than (*15 months from effective date of this Basin Plan amendment*).

34.1 Watershed-wide Nutrient Water Quality Monitoring Program

~~No later than (*3 months from effective date of this Basin Plan amendment *), t~~The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore and Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with interim and/or final nitrogen and phosphorus allocations; and (2) determination of compliance with the nitrogen and phosphorus TMDL, including the WLAs and LAs.

At a minimum, the stations specified in Table 5-9t and shown in Figure 5-3, at the frequency specified in Table 5-9t, shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. In addition to water quality samples, at a minimum, daily discharge (stream flow) determinations shall be made at all stations shown in Table 5-9t.

At a minimum, samples shall be analyzed for the following constituents:

- organic nitrogen
- nitrite nitrogen
- total phosphorus
- total hardness
- total suspended solids (TSS)
- biological oxygen demand (BOD)
- ammonia nitrogen
- nitrate nitrogen
- ortho-phosphate (SRP)
- total dissolved solids (TDS)
- turbidity
- chemical oxygen demand (COD)
- pH
- water temperature

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the WLAs/LAs shall be submitted by August 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. ~~Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment**) and~~ This individual monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the WLAs/LAs.

It may be that implementation of these monitoring requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and shall be implemented upon the Regional Board's approval.

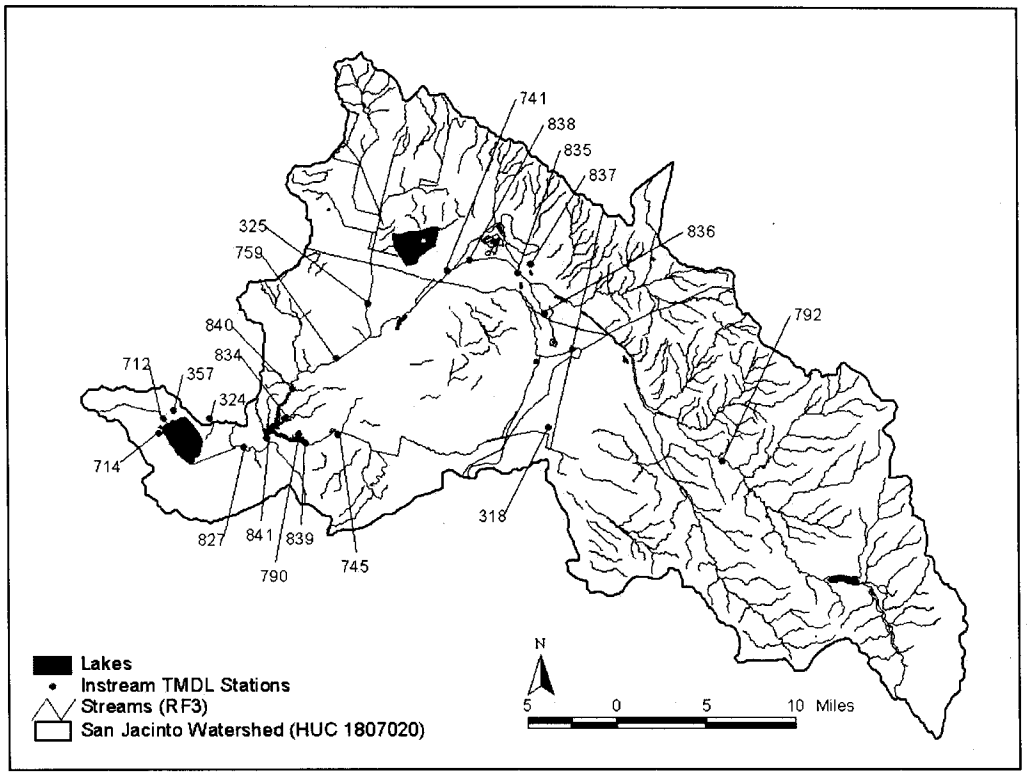

Figure 5-3 – San Jacinto River Watershed Nutrient TMDL Water Quality Stations Locations

Table 5-9t
Lake Elsinore and Canyon Lake Watershed
Minimum Required Sampling Station Locations

Station Number	Station Description
792	San Jacinto River @ Cranston Guard Station
318	Hemet Channel at Sanderson Ave.
745	Salt Creek @ Murrieta Road
759	San Jacinto River @ Goetz Rd
325	Perris Valley Storm Drain @ Nuevo Rd.
741	San Jacinto River @ Ramona Expressway
827	San Jacinto River upstream of Lake Elsinore
790	Fair Weather Dr. Storm Drain in Canyon Lake
357	4 Corners Storm Drain in Elsinore
714	Ortega Flood Channel in Elsinore
324	Lake Elsinore Outlet Channel
712	Leach Canyon Channel in Elsinore
834	Sierra Park Drain in Canyon Lake
835	Bridge Street and San Jacinto River
836	North Side of Ramona Expressway near Warren Road
837	Mystic Lake inflows
838	Mystic Lake outflows
841	Canyon Lake spillway

Frequency of sampling at all stations: dry season – none; wet season; minimum of 3 storms/year whenever possible and 8 samples across each storm hydrograph

~~3~~4.2 Lake Elsinore: In-Lake Nutrient Monitoring Program

~~No later than (*3 months from effective date of this Basin Plan amendment *), t~~The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Lake Elsinore nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Lake Elsinore.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9u and shown in Figure 5-4, at the specified frequency indicated in Table 5-9u. With the exception of dissolved oxygen and water temperature, all samples to be analyzed shall be depth integrated.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 5-9u
Lake Elsinore Minimum Required Sampling Station Locations

Station Number	Station Description
LE 14	Lake Elsinore – inlet
LE 15	Lake Elsinore – four corners
LE 16	Lake Elsinore – mid-lake

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

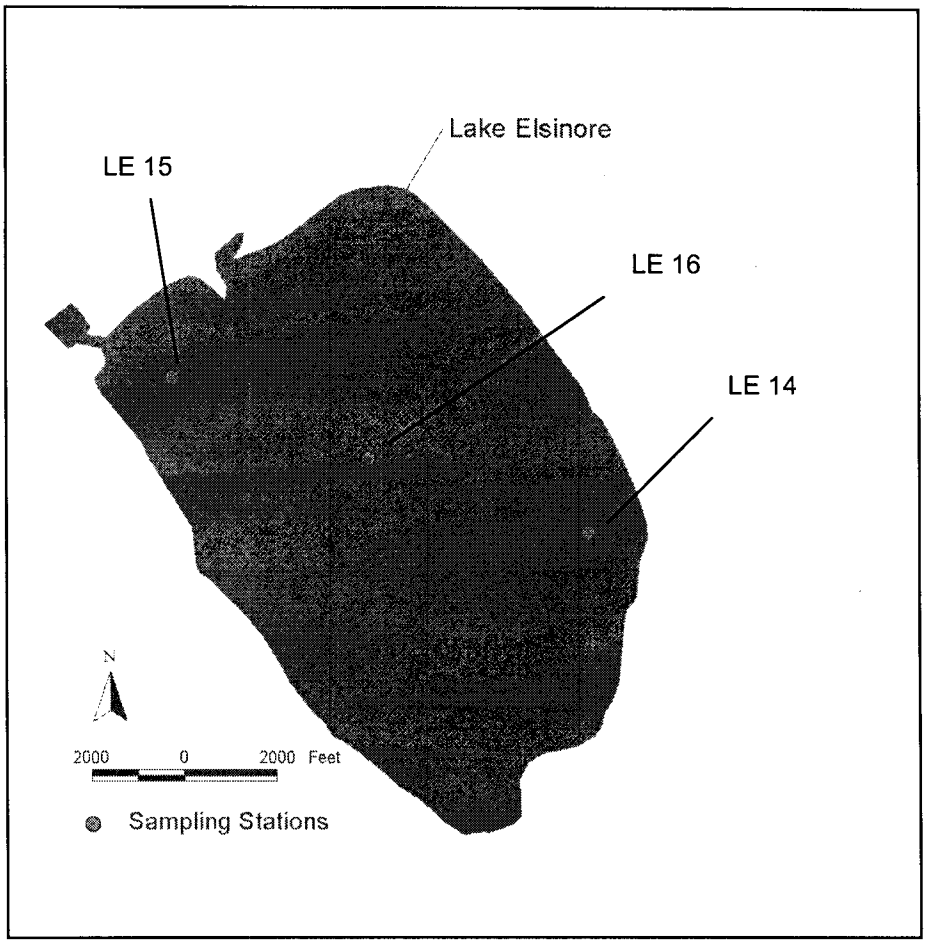

Figure 5-4 Lake Elsinore TMDL monitoring Stations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. ~~Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment*~~

~~*) and~~ This individual monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and shall be implemented upon the Regional Board's approval.

~~3~~4.3 Canyon Lake Nutrient Monitoring Program

~~No later than (*3 months from effective date of this Basin Plan amendment *),~~ tThe US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Canyon Lake nutrient monitoring program that will provide data necessary to review and update the Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Canyon Lake.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9v and shown in Figure 5-5, at the specified frequency indicated in Table 5-9v. Discrete samples in Canyon Lake are to be collected in the epilimnion, hypolimnion and thermocline when and where appropriate.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 5-9v

Canyon Lake Minimum Required Sampling Station Locations

Station Number	Station Description
CL 07	Canyon Lake – At the Dam
CL 08	Canyon Lake – North Channel
CL 09	Canyon Lake – Canyon Bay
CL 10	Canyon Lake – East Bay

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

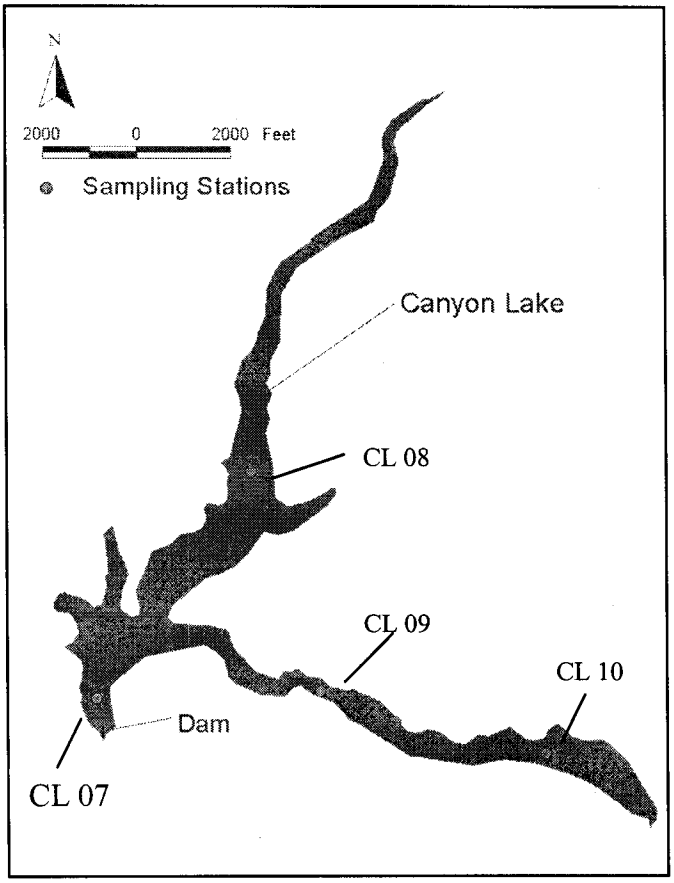

Figure 5-5 – Canyon Lake Nutrient TMDL Monitoring Station Locations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. ~~Any such individual or~~

~~group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment**)~~ ~~and~~ This individual plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and shall be implemented upon the Regional Board's approval.

Task 45: Agricultural Activities

No later than (*2 *years from effective date of this Basin Plan amendment* *), the agricultural operators within the Lake Elsinore and Canyon Lake watershed (see Task 3), in cooperation with the Riverside County Farm Bureau, the UC Cooperative Extension, Western Riverside County Ag Coalition ~~and agricultural operators within the Lake Elsinore and Canyon Lake watershed~~ shall, as a group, submit a proposed Nutrient Management Plan (NMP). The Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group Nutrient Management Plan to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than (*2 *years from effective date of this Basin Plan amendment* *). This Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

At a minimum, the NMP shall include~~,~~ plans and schedules for the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and/or agricultural LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- implementation of nutrient controls, BMPs and reduction strategies designed to meet load allocations;
- evaluation of effectiveness of BMPs;
- development and implementation of compliance monitoring; and
- development and implementation of focused studies that will provide the following data and information
  - inventory of crops grown in the watershed;
  - amount of manure and/or fertilizer applied to each crop with corresponding nitrogen and phosphorus amounts; and
  - amount of nutrients discharged from croplands.

The Regional Board expects that the NMP will be submitted and implemented ~~on a voluntary basis~~ pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will issue appropriate waste discharge requirements.

Compliance with the agricultural load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 56: On-site Disposal Systems (Septic System) Management Plan

No later than 6 months of the effective date of an agreement between the County of Riverside and the Regional Board to implement regulations adopted pursuant to Water Code Sections 13290-13291.7, or if no such agreement is required or completed, within 12 months of the effective date of these regulations, the County of Riverside and the Cities of Perris, Moreno Valley and Murrieta shall, as a group, submit a Septic System Management Plan to identify and address nutrient discharges from septic systems within the San Jacinto watershed. The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Section 13290 – 13291.7.

At a minimum, the Septic System Management Plan shall include plans and schedules for the development and implementation of the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and/or septic system LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- public education program;
- tracking system, including maintenance thereof;
- maintenance standards;
- enforcement provisions;
- monitoring program; and
- sanitary survey.

In lieu of a coordinated plan, one or more of the agencies with septic system oversight responsibilities may submit an individual or group Management Plan to develop the above Plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted no later than (**6 months from effective date of this Basin Plan amendment* *). This Septic System Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the septic systems load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 67: Urban Discharges

Urban discharges including stormwater runoff, includes those from the cities and unincorporated communities in the San Jacinto River watershed. These discharges are regulated under the Riverside County MS4 NPDES permit. Nuisance and stormwater runoff from state highways and right of ways is regulated under the State of California, Department of Transportation (Caltrans) statewide general NPDES permit. Finally, nuisance and stormwater runoff from the March Air Reserve Base is also regulated through an NPDES permit.

6.17.1 Revision to the Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. By August 1, 2006, the permittees shall review and revise the DAMP as necessary to address the requirements of these nutrient TMDLs. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the interim and final nutrient wasteload allocations. In

order to facilitate any needed update of the numeric targets and/or the TMDLs and/or urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The co-permittees shall also provide a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocation for urban runoff. The proposal must be implemented upon Regional Board approval at a duly noticed public meeting.

~~6.2~~7.2 Revision of the Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to develop and submit a WQMP by June 2004 for the Executive Officer's approval. By August 1, 2006, the permittees shall submit a revised WQMP that addresses the nutrient input from new developments and significant redevelopments to assure compliance with the nutrient wasteload allocations for urban runoff. The WQMP shall also address requirements currently in Order No. 01-34 (see 2.2, above). Once the WQMP is approved, Order No. 01-34 will be rescinded. Further review and revision of the WQMP necessary to assure that TMDL requirements are addressed shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

~~6.3~~7.3 Revision of the State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. By April 1, 2006, Caltrans shall submit a Regional Workplan that includes plans and schedules for meeting the interim and final nutrient wasteload allocations, and provides a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocations for urban runoff , which includes runoff from Caltrans facilities. In order to facilitate any needed update of the numeric targets and/or the TMDLs and/or urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The proposal shall be implemented upon the Executive Officer's approval. Annual updates to the Regional Workplan shall include, as necessary, revised plans and schedules for meeting the interim and final nutrient wasteload allocations and revised proposals for evaluating the efficacy of control actions and compliance with the nutrient wasteload allocations.

~~6.4~~7.4 Revision to the United States Air Force, March Air Reserve Base, Stormwater Permit

Order No. 99-6 specifies monitoring and report requirements for stormwater runoff from the US Air Force, March Air Reserve facility. Provision B.11.a and B.11.b requires that March Air Reserve Base submit a report and revise the Stormwater Pollution Prevention Plan (SWPPP) to address any pollutants that may be causing or contributing to exceedances of water quality standards. Results from the TMDL nutrient monitoring program conducted pursuant to Task 3, shall serve as the basis for revision of the SWPPP.

Development of the Municipal permittee's WQMP and revisions to their DAMP, development of the Caltrans SWMP and Regional Workplan, and Revision to the March Air Reserve Base SWPPP, shall address the urban component of the nutrient TMDL.

Compliance with the urban wasteload allocation may be achieved through a Regional Board approved pollutant trading program.

Task ~~7~~8: Forest Area ~~Revision~~ Identification of Forest Lands Management Practices~~Service Management Plans~~

No later than (**2 years from effective date of this Basin Plan amendment* *), the US Forest Service shall submit for approval a plan with~~and~~ a schedule for identification, development and implementation ~~review and~~ of Management Practices to reduce nutrient discharges emanating from the ~~revision of~~ the Cleveland National Forest ~~Service Management Plan~~ and the San Bernardino National Forest ~~Service Management Plan~~. The Plan shall ~~to~~ identify watershed-specific appropriate Best Management Practices (BMPs) that will be implemented to achieve the interim and final load allocations for forest~~/open space~~. The proposal shall include specific recommendations and a schedule for 1) evaluating the effectiveness of control actions implemented to reduce nutrient discharges from forest~~/open space~~ and 2) evaluating compliance with the nutrient load allocation from forest/open space. The revised watershed-specific ~~BMPs~~ Management Practices shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the open space/forest load allocation may be achieved through a Regional Board approved pollutant trading program.

Task ~~8~~9: Lake Elsinore Sediment Nutrient Reduction Plan

No later than (**~~6~~ 18 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, the State of California, Department of Transportation (Caltrans), the State of California, Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for in-lake sediment nutrient reduction for Lake Elsinore. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Lake Elsinore In-lake Sediment Nutrient Reduction Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Reduction Plan for approval by the Regional Board. Any such individual or group Plan is due no later than (**6 months from effective date of this Basin Plan amendment*)* and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the Lake Elsinore Sediment Nutrient Reduction Plan requirement may be achieved through a Regional Board approved pollutant trading program.

Task ~~9~~10: Canyon Lake Sediment Nutrient Treatment Evaluation Plan

No later than (**~~6~~ 18 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of

Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for evaluating in-lake sediment nutrient treatment strategies for Canyon Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments in order to develop a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Canyon Lake In-lake Sediment Nutrient Treatment Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Treatment Evaluation Plan for approval by the Regional Board. Any such individual or group Plan is due no later than (*6 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task ~~10~~11: Update of Watershed and In-Lake Nutrient Models

No later than (*~~6~~ *18 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for updating the existing Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The plan for updating the Watershed and In-lake Models shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group plan for update of the Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. Any such individual or group Plan is due no later than (*6 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task ~~11~~12: Pollutant Trading Plan

No later than (*2 years *from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed Pollutant Trading Plan. At a minimum, this plan shall contain a plan, schedule and funding

strategy for project implementation, an approach for tracking pollutant credits and a schedule for reporting status of implementation of the Pollutant Trading Plan to the Regional Board, The Pollutant Trading Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Pollutant Trading Plan. Any such individual or group Plan is due no later than (*2 years *from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task ~~12~~13: Review and Revision of Water Quality Objectives

By December 31, 2009, the Regional Board shall review and revise as necessary the total inorganic nitrogen numeric water quality objectives for Lake Elsinore and Canyon Lake. In addition, the Regional Board shall evaluate the appropriateness of establishing total phosphorus and un-ionized ammonia numeric water quality objectives for both Lake Elsinore and Canyon Lake. Given budgetary constraints, completion of this task is likely to require substantive contributions from interested parties.

Task ~~13~~14: Review/Revision of the Lake Elsinore/Canyon Lake Nutrient TMDL

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years[2] to determine the need for modifying the load allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, modeling analysis, and/or special studies by one or more responsible parties, changes to the TMDL, including revisions to the numeric targets, may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies

References

1. California Regional Water Quality Control Board, Lake Elsinore Nutrient TMDL Problem Statement, October, 2000.

2. California Regional Water Quality Control Board, Canyon Lake Nutrient TMDL Problem Statement, October 2001.

3. California Regional Water Quality Control Board, Total Maximum Daily Load for Nutrients in Lake Elsinore And Canyon Lake, May 2004

4. Environmental Protection Agency, Update of Ambient Water Quality Criteria for Ammonia. EPA-822-R-99-014, 1999.

[2] The three-year schedule will coincide with the Regional Board's triennial review schedule.

Index of Comments/Responses

Anthony J. Pack
General Manager
Eastern Municipal Water District (EMWD)
(Letter dated September 16, 2004)

EMWD Comments presented orally by Jayne Joy at the September 17, 2004 Board workshop)

Comment 1
The TMDL numeric targets for phosphorus and nitrogen will be included in recycled water discharge permits. The cost associated with meeting these numeric targets is significant.

Staff Response
First, a clarification of terms is appropriate. The proposed interim and final numeric TMDL targets are the goals for the receiving waters, while wasteload and load allocations apply to nutrient inputs from individual sources, such as recycled water. The purpose of these allocations is to assure that, cumulatively, the numeric targets will be met. If and when US EPA approves the proposed TMDLs, the WLAs for recycled water, not the lake numeric targets, would be incorporated into the permit.

Compliance with the wasteload allocations will likely require facility/operational changes and/or the implementation of a suitable offset program. Board staff encourages EMWD to investigate the costs of facility modifications; we are aware that very restrictive nutrient effluent limitations, comparable to those that would be required to be met pursuant to these TMDLs, if adopted, are being met elsewhere without extraordinary expenditure.

Comment 2
Although, it is stated that the TMDL numeric targets are solely numeric targets, in reality they will be used as water quality objectives. Therefore, economic analysis needs to be performed.

Staff Response
See response to Comment 68 in the September 17, 2004 Staff Report, Attachment B.

Comment 3
EMWD is concerned that the available mitigation projects will not meet watershed demands necessary to reach numeric targets. EMWD recommends that time be provided to evaluate the viability of pollutant trading and offset mitigation options.

Staff Response
Staff is not clear to which mitigation projects EMWD refers. In the proposed Basin Plan Amendment, staff has proposed a new Task 11 for the development of a Pollutant Trading Plan. The proposed due date for submittal of the Pollutant Trading Plan is two years after the TMDLs have been approved by US EPA. It is staff's opinion that this is sufficient time to allow stakeholders to evaluate all potential mitigation projects, as EMWD requested. We note that EMWD has not provided a proposed alternate due date or provided justification for why more than two years may be needed to develop the Pollutant Trading Plan.

Comment 4
EMWD would support the continuation of the pilot project for use of supplemental (recycled) water during the dry weather to ensure and stabilize the lake level. Without the pilot project, adoption of the TMDL would effectively prevent EMWD from contributing any recycled water to Lake Elsinore.

Staff Response
Staff recognizes the importance of a stable lake level and that a practical source of supplemental water to the lake is recycled water. Recognizing the importance of recycled water to Lake Elsinore, staff has recommended an allocation of a portion of the TMDL to this source. The need for water inputs to Lake Elsinore, however, does not take precedence over the need to control nutrient inputs (phosphorus and nitrogen) that have caused excessive algal growth, and depletion of oxygen, which have contributed to or caused fish kills. Obviously, the need to control nutrients must be balanced with the Lake water needs. Staff believes that the proposed TMDL does take these factors into account. All nutrient sources, including recycled water, must reduce the nutrient loads to the lake in order for lake water quality to improve. Staff believes that conventional and natural treatment processes exist to reduce nutrients in recycled water. Further, offsets programs or pollutant trading are an option to mitigate discharges of nutrients. Staff is committed to continuing to work with EMWD to develop appropriate options to enable recycled water discharges to Lake Elsinore to continue.

Comment 5
EMWD indicates that their cost estimates to treat recycled water to meet the proposed TMDL are $37,000,000, based on studies conducted by Carollo Engineers. These costs represent treating 8MGD; costs would increase proportionately when the treatment plant expands to 18MGD. EMWD further clarifies that LESJWA costs for treating recycled water (as referenced in the September 17, 2004 Staff Report, Attachment B - Response to Comments, Comment No. 69), applies only to phosphorus removal and does not include nitrogen removal.

Staff Response
Comment noted. See response to comment 1, above.

The following are specific comments on the proposed TMDL (Attachment to Resolution No. R8-2004-0037):

Comment 6
Page 4. The phosphorus and nitrogen targets listed in Table 5-9n are set at levels that cannot be attained without significant treatment costs and it is requested that an economic analysis be included in the TMDL.

Staff Response
See response to Comment 1 and Comment 2.

Comment 7
Page 7: It is our understanding that the waste load allocation for supplemental (recycled) water is based on total phosphorus of 0.2 mg/L, Table 5-9r for the final total phosphorus appears to be set at 0.1 mg/L.

Staff Response
The phosphorus WLA for the recycled water was calculated by multiplying an average volume of recycled water needed over 10-year period, by 0.5 mg/L for the interim compliance period (10-year) and 0.1 mg/L for the final compliance period (15-year). The May 2004 staff report , page 73, stated that 0.2 mg/L was used to calculate the final WLA for recycled water. This was an error in the staff report.

Comment 8
Page 8 D – the last paragraph states that "Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur." This is a broad statement that does not take into account the cost of achieving the numeric targets and other lake dynamics, such as low lake level, that may impact the aesthetics of the lake.

Staff Response
The referenced section is meant to discuss the critical condition of the lake with regard to nutrient input and how the TMDLs have attempted to address the critical condition. Staff certainly agrees that low lake levels or a dry lake affect the aesthetic and other beneficial uses of the lake and have dealt with those issues by recognizing that supplemental water is needed to stabilize the lake level. Accordingly, the proposed Elsinore TMDL includes wasteload allocations for recycled water inputs to the Lake.

Comment 9
Task 3.1, 3.2, 8, 10, and 11 – EMWD is listed as a responsible party for the studies associated with these tasks. Due to the significant costs associated with the meeting numeric targets, it may not feasible for EMWD to provide supplemental water to the lake. If EMWD cannot participate, then EMWD should not be listed as a responsible party.

Staff Response
EMWD is currently in discussions with the Regional Board staff regarding potential permit requirements for recycled water discharges to Lake Elsinore as part of the District's permit renewal. Therefore, staff does not believe that it is appropriate to remove EMWD from the requirements specified in the TMDL at this time. Staff has included language in the Basin Plan amendment specifying that, if at a later date EMWD decides not to discharge recycled water to Lake Elsinore, EMWD will be removed from the responsibility for the TMDL tasks mentioned above (see the Attachment to Resolution R8-2004-0037).

Warren D. Williams
General Manager-Chief Engineer
Riverside County Flood Control and Water Conservations District (District)
(Letter dated October 13, 2004)

District comments presented orally by Jason Uhley at the September 17, 2004 Board workshop)

Comment 10
Due in large part to the efforts of the Regional Board staff to work with the stakeholders to write the TMDLs in a fashion to allow further development of the science and understanding of the watershed and ultimately revise the numeric targets, the District is willing to look past the scientific and technological deficiencies and agree to participate in a cooperative effort with all the identified parties. We look forward to have the Regional Board's continued active participation in this TMDL effort, including providing technical guidance, assistance in obtaining grant funding, and judicial application of regulatory tools available to them.

Staff Response
Staff appreciates the willingness of the District to participate in a cooperative effort to improve the water quality of Canyon Lake and Lake Elsinore. Given the watershed hydrology, complex land uses in the watershed and the history of fish kills and algal blooms in Lake Elsinore, Board staff believes that the cooperation of all stakeholders will be vital to improve the water quality and beneficial uses of the lakes.

Subject to resource constraints, it is Regional Board staff's desire and intent to stay actively involved in the implementation of this TMDL. Staff involvement could include issuing waste discharge requirements, enforcing the permit conditions and continuing to work with the stakeholders to obtain grant funding to carry out projects that will improve water quality in the watershed. As you know, TMDL development and implementation is the highest priority for the State and Regional Board for grant funded projects. Staff will also stay involved in activities related to the monitoring and model updates of the lakes and watershed in order to better facilitate any needed revisions to the TMDLs in the future.

Comment 11
The TMDL compliance schedule needs to recognize the lack of an organizational structure for implementing the TMDL program. The TMDL doesn't identify who's in charge, what basis for financial responsibility is. It is going to take a significant amount of time, particularly more time than specified in the TMDL, to develop the organizational structure capable of producing specified compliance documents and cooperative implementation agreements.

Staff Response
Board staff recognizes the importance of stakeholders cooperatively working together to implement the proposed TMDL. However, the Regional Board has no legal authority to dictate the stakeholder group structure or the financial responsibility distribution of such a group. It is staff's opinion that this effort is the responsibility of the implementing stakeholders. Nonetheless, Board staff is willing to work with the stakeholders to assist in the formation of a stakeholder group.

We note that based on June 3, 2004 comments from the RCFCD, due dates for specific tasks were modified in the proposed TMDL/Basin Plan Amendment (see September 17,

2004 Staff Report, Attachment A). Staff believes that the revised compliance dates allow sufficient time to form a stakeholder group and we understand that such an effort has been initiated.

See also comment 14 below for additional compliance dates modifications that staff supports.

Comment 12
The Regional Board should facilitate the TMDL implementation organizational effort by clearly identifying all responsible parties, including agricultural entities. The Regional Board should also clearly identify the regulatory tools that can be utilized to assist stakeholders in gaining the support of various responsible parties.

Staff Response
In the proposed TMDL/Basin Plan Amendment, Board staff has identified the responsible parties for each task and compliance schedules. We agree with the recommendation to also include a task in the TMDL for Regional Board staff to compile a list of responsible agricultural operators for implementing the TMDL and to notify those operators of their responsibility. Staff proposes that this task be completed no later than 1 month from TMDL approval in order to ensure that the monitoring program due dates are met (the proposed monitoring program, Task 3, is due no later than 3 months from TMDL approval). This modification to the proposed TMDL is shown in the Attachment to Resolution No. R8-2004-0037.

Staff does not believe that additional clarification of the enforcement tools available to the Regional Board needs to be included as part of the TMDL. Once the TMDL is incorporated into the Basin Plan, all the regulatory tools specified in the Porter – Cologne Water Quality Control Act (California Water Code Section 13000 *et seq.*) are available to the Regional Board, should the responsible parties fail to comply with the specified tasks on schedule. In addition, discussion of these enforcement options is already included in the Basin Plan (Chapter 5 – Implementation).

Comment 13
Regional Board should provide launching point for TMDL implementation. This would include a recommendation for a fair and rational basis for allocating financial responsibility among parties.

Staff Response
See response to Comment 11.

Comment 14
The following compliance schedules due dates should be expanded by at least a year.

Task	Description	Current TMDL Compliance Date	RCFCD Recommended Compliance Date
Task 3	Nutrient Water Quality Monitoring Program	**3 months** after BPA approval Annual reports due August 15	**15 months** after BPA approval Annual reports due August 15
Task 8	Lake Elsinore Lake In-Lake Sediment Nutrient Reduction Plan	**6 months** after BPA approval	**18 months** after BPA approval
Task 9	Canyon Lake In-Lake Sediment Treatment Evaluation	**6 months** after BPA approval	**18 months** after BPA approval
Task 10	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	**6 months** after BPA approval	**18 months** after BPA approval

Staff Response
As shown in the Attachment to Resolution No. R8-2004-0037, staff agrees that revisions to Task 8, 9 and 10 compliance dates specified in the proposed TMDL are warranted to allow additional time for an appropriate stakeholder group to form and agreements to be developed.

However, because of the need to continue implementation of the existing watershed and lakes monitoring program, staff does not believe that the time should be extended for Task 3 (Nutrient Water Quality Monitoring Program). An extension from a compliance schedule of 3 months to 15 months would result in no data being collected for 1 year after TMDL approval, representing a significant gap in the data collection effort. Staff believes it is appropriate to specify that a plan/schedule for the implementation of the existing monitoring program identified in Task 3 be due within 3 months of TMDL/Basin Plan amendment approval and that, if needed, a revised monitoring program plan/schedule be due within 15 months of TMDL/Basin Plan amendment approval (see the Attachment to Resolution R8-2004-0037).

Comment 15
The District requests that the following discussion be appended to the end of the Introduction of the Technical Report:

> "In summary, the science supporting the interim and final TMDL numeric targets for total phosphorous and final TMDL numeric target for total nitrogen (numeric targets) proposed in the BPA is preliminary. Where science was lacking, Staff selected numeric target values conservatively for nutrients. The ability of the TMDL to achieve these standards has been called into question by the Regional Board's own peer reviewer, Dr. Josselyn."

The district further notes that Dr. Josselyn acknowledges the eutrophic nature of Lake Elsinore and that the lake cannot naturally support the assigned beneficial uses. Acknowledging that additional studies and review are needed, the District points out that revising the beneficial uses to those that can be supported under these natural lake conditions may be warranted.

Staff Response
Comment noted. Staff believes that the record of this matter speaks for itself. In the May 2004 Technical TMDL Report and in Responses to Comments (see, for example, September 17,2004 Staff Report, Attachment B, comments 15 and 46), staff has acknowledged that the TMDL is based on limited data for the watershed and that a complete understanding of the lake nutrient dynamics and the ecologic health is needed. Recognizing these deficiencies, phased TMDLs and extended compliance schedules are proposed. As shown in the Attachment to Resolution R8-2004-0037, Task 13, the language reflects the fact that the TMDLs will be reviewed and/or revised based on updated data/information.

The Regional Board has the legal obligation to establish nutrient TMDLs since the Board found that excessive nutrient input has caused the impairment of the beneficial uses of the lakes. The TMDLs must be based on the best available data. Using the best data available, staff selected numeric targets that would assure the protection of beneficial uses. However, given the very unique hydrologic conditions of the watershed and the long history of water quality problems in Lake Elsinore, the available data only reflect a snapshot of the conditions of the lake. For these reasons, the TMDL is a phased TMDL and provides the opportunity for updates every 3 years, based on additional data.

Staff would also like to emphasize, as pointed out by US EPA in their comment letter dated June 3, 2004 (see Comment 105 in the September 17, 2004 Staff Report, Attachment B), that the Regional Board committed to submitting the Lake Elsinore/Canyon Lake TMDLs to US EPA by 2005. Moving toward timely adoption of these TMDLs will ensure that this commitment is met.

Comment 16
If the additional science and analysis does not indicate that more assimilative capacity is available in the lakes, then a review of the Basin Plan Beneficial Uses may be in order to determine whether the existing designated beneficial uses for the lakes can be supported by natural conditions. The State Water Resources Control Board has issued draft guidance that indicates that standards should be revised based on attainability:

> "If the failure to attain standards is due to the fact that the applicable standards are not appropriate to natural conditions, an appropriate regulatory response is to correct the standards" (December 2003 State Board Draft Water Quality Control Policy for Addressing Impaired Waters)

It is [Flood Control District] Staff's expectation that the phased analysis proposed by this TMDL will lead to the identification of additional assimilative capacity in the lakes and upper watershed.

Staff Response
The basis for the comment that staff's expectation of additional assimilative capacity is not clear. The proposed TMDLs seek to identify the maximum amount nutrients that can enter the lakes while water quality standards are achieved. The fact that reductions in nutrient loading are necessary speaks to the lack of assimilative capacity. Achieving water quality standards does not necessarily result in increased assimilative capacity.

The beneficial uses of Lake Elsinore established in the Basin Plan are existing uses and cannot be removed. The uses may be refined such that less stringent water quality criteria would apply, provided that certain criteria in relevant federal regulations are met. Specifically, a Use Attainability Analysis (UAA) would be required. In staff's experience, conducting UAAs is fairly expensive, and we would not expect it to be a simple or easy process. It is more likely that the numeric targets and resulting TMDL, WLA and LA could be revised based on any additional data and information and/or if additional studies indicate that the lake has additional assimilative capacity to maintain the designated beneficial uses.

Comment 17
The legal basis for the TMDL requirements is not clear. The District does not contest the right of the Regional Board to adopt a TMDL to regulate discharges to impaired receiving waters, however, the regulatory authority to require "retroactive clean up" of the sediments or nutrients in the lakes does not appear to exist in either the Clean Water Act or Porter-Cologne. The District requests that the authority to regulate the removal of sediments from the lakes by the upstream stakeholders be cited in the TMDL basin plan amendment. Without this authority, the Regional Board must assign Tasks 8 and 9 to place responsibility solely on the entities who own the lakes.

Staff Response
Pursuant to Section 13304 of the California Water Code, the Regional Board has the authority to require the **cleanup and abatement** of waste. Specifically, the Water Code provides:

> § f13304 (a) Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.

Staff has identified sources of nutrients to Canyon Lake and Lake Elsinore that have occurred over the long term. The dischargers of those nutrients are responsible for the cleanup and abatement of the nutrients in the lake sediments. The approach that staff proposes to implement through the TMDL is not to issue Cleanup and Abatement Orders to dischargers of nutrients (although the Regional Board has the authority to do so), but to work cooperatively to address the internal sediment loads. Again, there is no reason that this regulatory authority should or needs to be included in the TMDL.

Comment 18
Board staff's contention that the proposed numeric targets are only interpretations of existing water quality standards and not Water Quality Objectives does not comport with the California Water Code. Upon adoption, the numeric targets would carry the weight of water quality objectives. The District supports EMWD's June 3 verbal comments regarding this issue.

Staff Response
See response to Comment 2 and response to Comment 68 in the September 17, 2004 Staff Report, Attachment B.

Comment 19
The recent Superior Court ruling in City of Arcadia *et al* versus The SWRCB and Los Angeles Region RWQCB (December 24, 2003), states that any amendment of a Basin Plan, independent of whether it adopts water quality objectives, is subject to Section 13241 of the California Water Code. Despite the appeal of this decision, the District holds that the Superior Court ruling was consistent with the intent of the law.

Staff Response
See response to comment 3 in the September 17, 2004 Staff Report, Attachment B.

Comment 20
Current nutrient BMP technologies, particularly those referenced in the September 17th Regional Board staff report, are not capable of economically or technologically addressing the volume of water generated during a wet year. These BMPs are generally sized to treat flows from the average annual storm event and would short-circuit during wet year events. However, wet years are the only years that the upper watershed stakeholders contribute significant nutrient loads to Canyon Lake and Lake Elsinore. If the wet years cannot be treated, compliance with the interim phosphorus target for the TMDL is mathematically impossible for discharges to Canyon Lake.

Staff Response
Staff does not disagree with the assessment presented by the District. However, it is important to emphasize that the TMDLs and corresponding WLAs are to be met as a 10 year running average, with interim compliance with the TMDL, WLAs to be achieved by 2015 and final compliance with the TMDL, WLAs to be achieved by 2020. Staff recognizes that the treatment of nutrients in the large storm events is likely to be difficult, however it may be balanced with years of perhaps zero discharges. Further, as was pointed out in the Response to Comment 2 in the September 17, 2004 Staff Report, Attachment B, it is likely that BMP technology to address the TMDL nutrient discharges in stormwater runoff will advance in the future. The District needs to pursue the development and implementation of such technology; it is inappropriate to assume that current BMPs must necessarily remain the standard of performance. Moreover, as we have pointed out in previous responses to comments (see September 17, 2004 staff report, Attachment B, Comments 18, 57 and 92), compliance may entail the implementation of offset or trading programs, not just BMP implementation.

In addition, staff would like to point out that for the Canyon Lake nutrient TMDL, no reduction in internal loading was assumed. This is one reason that the required reduction in external load is so great. When the stakeholders evaluate options to reduce the internal Canyon

Lake loading, such as through dredging, alum treatment, or other in-lake treatments, (as is required by Task 9 in the Basin Plan amendment), the allowable external load will likely increase; revision to the WLAs and LAs would be appropriate and can be addressed in the periodic review of the TMDL.

Comment 21
Based on the EPA's Urban Nutrient Reduction BMP Costs (1999) referenced in the Regional Board Staff Report, the District constructed a table showing estimated costs associated in the construction of nutrient reduction BMPs in the San Jacinto River Watershed to address the wet year flow volume (139,345 ac ft or approximately 6 billion cubic feet). The cost estimates presume each stakeholder in the watershed tributary to Canyon Lake would implement the specified BMP. Urban Stakeholder BMP costs, based on a rough estimation of land use (both urban areas and non-urban areas tributary to urban systems) and runoff rates, could represent between 50-60% of the total cost identified.

Staff Response
Comment noted. This information will be included in the staff report for the Regional Board's consideration.

Comment 22
Several references have been made at the stakeholder and Regional Board workshops regarding the success of the Newport Bay Nutrients TMDL. Although Orange County (OC) has had great success with achieving nutrient TMDL targets in Newport Bay, the OC-Permittees have noted that the nitrogen concentrations in their upper watershed can exceed 10 mg/l TN and have been able to reduce nitrogen concentrations to 2 mg/l. The OC-Permittees estimate expenditures of approximately $5 million per year in capital and operational costs in order to achieve the nutrient targets. Stormwater discharges in the San Jacinto Watershed average 2-5 mg/l TN and stakeholders in this watershed will be required to reduce nitrogen concentrations to 0.75 mg/l. The TMDL programs are not numerically comparable – the proposed runoff concentrations to be achieved in the San Jacinto Watershed are significantly lower and economically unachievable under the best available BMP technologies. Further, treatment efficiency for available nutrient treatment BMPs diminishes as the effluent concentration is reduced and as the influent concentration approaches the required effluent concentration. The costs neither balance nor justify the anticipated benefits.

Staff Response
Staff agrees that the Lake Elsinore/San Jacinto River watershed is different from the Newport Bay watershed in that Lake Elsinore is a terminal receiving water that is much more sensitive to the nutrients than Newport Bay, where tidal flushing occurs. The reference to the Newport Bay TMDLs was made, in part, to highlight the success of the TMDL program in the watershed, particularly through commitment by the Regional Board working cooperatively with the stakeholders to address TMDL requirements. Staff's intent in discussing the Newport Bay nutrient TMDL was also to emphasize the similarities between the Newport Bay nutrient TMDL and the proposed Lake Elsinore/Canyon Lake TMDLs. Prior to the approval of the Newport Bay TMDL questions and concerns were raised about the lack of data, appropriate receiving water numeric targets, scientific validity of the TMDL approach, and achievability and appropriateness of the TMDL/WLAs/LAs. These issues are also being raised with respect to the Lake Elsinore/Canyon Lake TMDLs. Yet, in Newport Bay, these issues are being addressed in a proactive manner by the stakeholders and

Board staff with the intent of refining the TMDL in the future. This is the same approach that staff has proposed in the Lake Elsinore/Canyon Lake TMDLs.

Further, stakeholders in the Newport Bay watershed have gotten together to implement the TMDL and achieved the load reduction initially considered economically infeasible and technologically unachievable. The lesson from the Newport Bay TMDL is that once the stakeholders are committed to improving water quality utilizing resources and creativity, the results can be positive.

Additional Proposed Recommendations

Comment 23
Recommendation 1: Set narrative targets for nutrients since the TMDL is predicated on numeric targets that are intended to be more flexible than Water Quality Objectives. Another alternative is to consider the adoption of narrative targets for TP and TN. The narrative nutrient targets could require that discharges from the upper watershed not lead to exceedances of numeric dissolved oxygen concentration targets established for the Lakes; this would provide the stakeholders with additional flexibility to address the algal problems in the Lakes and would ensure that they are not penalized for non-compliance with an arbitrary numeric target.

Staff Response
Staff does not agree that only a dissolved oxygen target is needed for Lake Elsinore. While adequate dissolved oxygen concentrations may indeed prevent fish kills, fluctuations in dissolved oxygen levels are directly related to nutrient input. Dissolved oxygen is a response variable intended to assess the overall lake health; however, according to federal law and regulation, the TMDLs must also include targets that are directly related to the "polluting parameters", in this case phosphorus and nitrogen.

Comment 24
Recommendation 2: The Regional Board should facilitate the stakeholder organization effort by clearly identifying all responsible parties, including agricultural entities in either the technical report of Basin Plan.

Staff Response
See response to Comment 12. Because of the time that it may take to compile a list of all agricultural operators in the watershed, verify the owners and addresses, staff proposes that this effort be added to the proposed Basin Plan amendment/TMDL as a task for Board staff to complete within 1 month of TMDL approval. Staff will make every effort to complete the list prior to that time.

Comment 25
Recommendation 3: The Regional Board should also clearly identify in the Basin Plan the regulatory tools, such as NOV's, written requests or other actions that can be utilized to assist the stakeholders in gaining the support of the various responsible parties. The list should also identify how these tools may be used to ensure cooperation in and compliance with this proposed TMDL. For instance, how will regulatory tools be applied to assure all responsible parties financially support the joint monitoring requirements and the formulation and implementation of the Lake Sediment Nutrient Treatment requirements?

Staff Response
See response to Comment 12.

Staff also needs to point out that, as the Basin Plan amendment/TMDL indicates, the various named responsible parties in the TMDL are under no obligation to ***collectively*** implement the various TMDL requirements. Therefore, there are no "regulatory tools" for the Regional Board to use to force parties to work collectively with the other stakeholders to implement the TMDL. However, the Regional Board can provide motivation for collective approaches by requiring individual dischargers to implement the TMDL requirements either individually or through a group approach. It is staff's opinion that it would make sense for all parties to work together cooperatively to implement the lake and watershed monitoring programs and studies required in the TMDL. The District should be assured that if a responsible party opts not to cooperate with the other stakeholders, all the TMDL requirements still apply and, again, the non-participating responsible party would be required itself to fulfill those requirements.

Comment 26
Recommendation 4: The Regional Board provide a launching point for TMDL implementation by recommending a fair and rational basis for allocating financial responsibility among all parties.

Staff Response
See response to Comment 11.

Comment 27
Recommendation 5: The compliance schedule for joint tasks should be extended by at least one year to accommodate the formation of a stakeholder organization, allow time for stakeholders to secure funding, and provide time for necessary consultants to be selected and contracted with.

Staff Response
See response to Comment 13.

Comment 28
Recommendation 6: If further analysis indicates that the lakes are naturally eutrophic, and thus the applicable standards are not appropriate to the natural conditions, the Regional Board should support a Use Attainability Analysis, or other appropriate mechanism, per the Water Quality Control Policy for Addressing Impaired Waters, to revise designated Beneficial Uses for the lakes.

Staff Response
See response to Comment 16.

Ronald Young
General Manager of Elsinore Valley Municipal Water District
(Oral Comments presented at the September 17, 2004 TMDL workshop and letter dated October 13, 2004)

Comment 29
The role of nutrients (and thus TMDLs) in Lake Elsinore is subordinate to lake level or the climate. Because of their minimal impact, it is unlikely that the TMDLs as proposed will bring any noticeable increase in beneficial uses. However, the lake can be improved without the traditional imposition of more restrictive TMDL values. The LESJWA Biomanipulation Plan that is dependent on a series of mechanical capital facilities is a nontraditional approach by providing appropriate lake ecology and managing and balancing the lake food web to control dominate species such as algal and carp.

Biomanipulation to address Lake Elsinore water quality is not taken into account in the TMDLs.

Staff Response
See response to Comments 71 and 81 in the September 17, 2004 Staff Report, Attachment B.

Board staff has been working closely with LESJWA on the Lake Elsinore restoration plans and studies. Staff has supported the carp removal effort and nutrient removal studies. However, staff is not aware of the Biomanipulation Plan referenced by Mr. Young. According to the draft Fishery Management Plan for Lake Elsinore (EIP Associates, 2004), in order for fishery management to be successful in Lake Elsinore, lake water quality (e.g., nutrient input) must be improved. It is of significant concern to staff that LESJWA's funding will run out before implementing many of the proposed projects and therefore, many of the biomanipulation projects may not be implemented. A similar situation occurred in the 1990's when the Lake Elsinore Management Agency (LEMA) ran out of money. Many of the LEMA projects slated for implementation were, in fact, never implemented, due, in part, to the lack of funds. Hopefully, history will not repeat itself. The TMDL program requires needed watershed and lake monitoring programs and special studies and provides incentives for stakeholders to work together to implement proposed LESJWA projects to improve water quality and the ecological health of the Lake.

Comment 30
The N, P and chlorophyll-a standards are unrealistically low for a lake with such a high ratio of watershed to lake surface area. These targets would not provide acceptable water clarity or protection from fish kills or algal blooms. The targets are not reflective of the historic eutrophic nature of the Lake. LESJWA is currently studying lake sediments (10 meter deep core samples) which have been dated to be between 8,000 and 11,000 years old. Nutrient studies of this core material are currently underway, which could reveal the "natural" past of Lake Elsinore and should affect TMDL limits.

Staff Response
See response to Comment 71 in the September 17, 2004 Staff Report, Attachment B.

The interim TMDL numeric targets for Lake Elsinore were selected based on historical water quality during the 2000-2001 period. The values of the N, P and chlorophyll-a indicate the

eutrophic status of Lake Elsinore. Staff is aware of the LESJWA sediment core study being conducted. As staff has indicated on numerous occasions, if the results of the studies warrant a revision to the TMDL numeric targets, and/or the TMDL, WLAs or LAs, these revisions can be done within the phased TMDL framework.

Staff would also like to emphasize in response to this comment and most of the District's comments, that the proposed TMDL contains specific language for review and update of the TMDL based on the studies and/or data collection effort. **Task 14 specifies that the TMDL will be reviewed every 3 years and revisions made if warranted. This represents a significant commitment by Regional Board staff to continue to work with stakeholders to collect additional information and data on the lake and watershed, review any new data and propose revisions to the TMDL, if warranted.**

Comment 31
Environmental Checklist. In section VIII b) under Hydrology and Water Quality, "no impact" is listed as to the effect of lowering or depleting groundwater supplies. EVMWD is in the process of adopting a Groundwater Management Plan in compliance with AB 3030. If use of the Island wells as part of the source of water for the lake is a mitigation requirement, the impact could contribute to overdraft of the groundwater basin. Review of the Final Draft Elsinore Groundwater Basin Management Plan should be done prior to adoption of the TMDL.

Staff Response
Staff is aware of the effort by EVMWD to develop a Groundwater Management Plan. However, it is not clear to Board staff if EVMWD has committed to supply water from the island wells to Lake Elsinore on a long-term basis. Further, for the initial study for the Recycled Water Pilot Project, no impact from extraction from the Island Wells of 10,000 AF was identified. The CEQA checklists asks if the project would "...substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?" Since this was not identified as a potential impact in the Pilot Project, staff is not convinced that it needs to be identified as a potential impact in the TMDL Checklist. We also point out that a project such as long term groundwater extraction would need to undergo a separate and complete CEQA review outside of the TMDL CEQA review process. Finally, we note that in the Department of Water Resources, Southern District, April 1981 document "Investigation of Groundwater Supply For Stabilization of Level of Lake Elsinore, Riverside County. A Report to Department of Parks and Recreation under Interagency Agreement 162083", it was determined that pumping as much as 7,200 acre-feet of ground water annually could be continued for at least 30 years at the present well sites. After that, pumping could be continued for equal length of time at other well sites and that this pumping would have little effect on ground water levels and create no subsidence outside the lakebed.

Comment 32
Nutrient Load Model. The model is used to determine the nutrient loads allowable within the Lake and allocated to various sources. The total phosphorus (TP) limit has been conservatively set at 0.10 mg/l, which is the 25th percentile of a period of data. If a 50th percentile is used (0.12 mg/l), the TP load capacity would increase by 10,000 kg/yr. We believe a closer look at the MOS assumptions, especially for the interim 2015 WLA would be

beneficial and could be the subject of further refinement as the future studies are completed before 2015.

Staff Response
Staff agrees that basing the numeric targets on a 50th percentile results in a load capacity that would allow 10,000 kg/yr more loading of total phosphorus. The 25th percentile is a conservative approach and, more importantly, is consistent with the method recommended by the US EPA in the nutrient criteria development guidance manual. Staff does not believe that the District has provided technical justification for selecting the 50th percentile other than the fact that it results in a less restrictive TMDL. Further, if staff were to propose using the 50th percentile TP values, then it is likely that an explicit MOS would need to be specified because of the less conservative approach of taking the 50th percentile. It may be that factoring in an explicit MOS would result not result in a less stringent TMDL/WLAs/LAs after all. Therefore, staff does not propose to revise the proposed interim TP numeric targets values nor the TP load capacity calculation.

Staff would like to point out that the WLA for recycled water was calculated based on BAT for phosphorus treatment as planned by the Eastern MWD. In fact, the TP concentration of the recycled water from Eastern MWD was determined to be within the TP limit used to calculate the WLA for TP. We also note that the LESJWA budget provides funding for EVMWD to upgrade the treatment plant to meet the TP effluent limit. Staff believes that there is no justification to revise the TP WLA at the present time.

Comment 33
There may be a need to take another look at selecting 1994 as the moderate year for modeling. In may make sense from a hydraulic point of view, but from a nutrient loading perspective it is anomalous in that it follows one of the highest flood years on record. Watershed conditions may not be similar to in-lake conditions that have been altered by cumulative effects of irregular prior years.

Staff Response
Comment noted. Staff agrees that watershed runoff conditions from one year affect in-lake conditions in subsequent years. It is because of that effect that staff is proposing that the TMDL/WLAs/LAs be met over the long term, taking into account varying hydrological conditions, instead of specifying the TMDL/WLAs/LAs as an annual average.

Comment 34
Recommendation 1. A target water elevation of 1246 ±1.0 ft msl should be established as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 26 feet maximum water depth.

Staff Response
See response to Comment 73 in the September 17, 2004 Staff Report, Attachment B.

Comment 35
Recommendation 2. Biomanipulation and in-lake TMDL management targets (methods) should be set in place of numeric N, P, chlorophyll, or Secchi targets, at least in the short term. This would allow time to evaluate results of LESJWA's adaptive management approaches.

Staff Response
See response to Comment 29 above, and response to Comment 74 in the September 17, 2004 Staff Report, Attachment B.

Comment 36
Algae productivity is limited by light and CO_2 and not nitrogen or phosphorus.

Staff Response
See response to Comment 80 in the September 17, 2004 Staff Report, Attachment B.

Comment 37
Recommendation 3. No targets for in-lake nutrients (N and P) should be set with the exception of the DHS rule of less than 10 mg/L as N for Canyon Lake (protection of drinking water).

Staff Response
See response to Comment 75 in the September 17, 2004 Staff Report, Attachment B.

Comment 38
Recommendation 4. Nitrogen should be defined as biologically available Total Inorganic Nitrogen (TIN) not Total Nitrogen (TIN + biologically unavailable organic-N) in lake targets and lake models.

Staff Response
See response to Comments 76, 77and 79 in the September 17, 2004 Staff Report, Attachment B.

Comment 39
Phosphorus should be defined as either 80% total phosphorus (TP) or bio-available TP.

Staff Response
See response to Comment 77 in the September 17, 2004 Staff Report, Attachment B.

Comment 40
Variable lake levels should trigger change of beneficial use designation in the Basin Plan. With the lake drying out historically, the beneficial use designations of WARM, REC1 AND REC2 may be overstated because of their intermittent opportunity.

Staff Response
See response to Comment 16, above.

Comment 41
Lake Elsinore's primary problem is related to water levels. The TMDL should take water level into account. The primary source of water to the lake is recycled water, however the proposed TMDL could limit the volume of recycled water that could be discharged to the lake due to restrictions on TN and TP.

Meeting the existing TIN Basin Plan objective of 1.5 mg/L would be difficult, if not impossible to meet under conventional nutrient removal processes for recycled water.

Staff Response
See response to Comment 73 in the September 17, 2004 Staff Report, Attachment B.

Recognizing the difficulty in reducing recycled water nutrient levels, as noted in the May 2004 TMDL Report, Board staff has attempted to address WLA compliance by the POTWs. The recycled water permit would allow the implementation of an offset program, should strict compliance with effluent limitations based on the recycled water wasteload allocations be demonstrated to be infeasible. Implementation of an offset program in lieu of strict compliance with the numeric limit would require the discharger to assure removal from the lake of phosphorus and/or nitrogen discharged above the numeric limit on at least a one-to-one basis.

Based on information provided to Board staff by the Director of Operations at the Las Vegas Treatment Plant, in order to meet the Lake Mead WLA with TP discharge limit of approximately 0.26 mg/L, phosphorus reduction has been accomplished at the facility through Bardenpho phosphorus removal (BPR) activated sludge followed by sand filtration to remove particulate phosphorus[1]. The proposed interim WLA for recycled water discharges to Lake Elsinore was calculated based on assuming the effluent TP limit of 0.5 mg/L. This seems to be economically achievable and staff notes that LESJWA has already committed to funding to upgrade to treatment plant at the EVMWD to meet this effluent limit. In staff's opinion, these treatment plant modifications could be completed within the 5 year NPDES permit cycle and therefore, staff is proposing to modify the Basin Plan amendment to indicate that compliance with the WLA for Lake Elsinore supplemental water should be met as soon as possible as an annual average.

With respect to nitrogen removal, staff would like to point out that EVMWD could consider un-conventional nutrient removal methods such as wetlands. For example, on average during the period from 1999 through September 2004, Orange County Water District's Prado wetlands, which treats the effluent dominated Santa Ana River, removed 64% of nitrate-nitrogen and the Irvine Ranch Water District's wetlands removed approximately 55% of total nitrogen and 70% of TIN[1].

Because Board staff realizes the importance of providing the recycled water to Lake Elsinore, we have been working with the District to develop an appropriate strategy and plan for implementation of the TMDL and WLA . We must emphasize, however, that while providing a reliable water supply to Lake Elsinore is important, it is also important to control nutrient discharges in the recycled water.

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[1] References:

- D. Drury, P. Pai, M. Clyburn, S. Semenza, D. Dielmann, W. Shepherd, 2004, Operational Strategies and Treatment Technologies for Meeting Very Low P Limits, Water Environment Federation, 77th Annual Conference and Exposition.
- Irvine Ranch Water District (IRWD), 2003. San Joaquin Marsh Nutrient Removal Summary, Presentation by Jim Hyde at the [Newport Bay] TMDL review workshop.
- Orange County Water District, October 2004, personal communication with Greg Woodside.

Comment 42
There appears to be salinity toxicity to zooplankton in Lake Elsinore. This affects the abundance of zooplankton that would feed on the algae.

Additional studies are needed to understand the ecology of the lake.

Staff Response
Staff agrees that it is worthwhile to conduct additional studies to gain a better understanding of the lake ecology. As part of the proposed TMDL, staff has included studies to evaluate reduction in internal lake sediment nutrient levels, and updates of the watershed and lake models. If there are additional studies related to nutrients that EVMWD believes need to be required of stakeholders in the TMDL, the District needs to forward that input to staff in order for make that information available for Regional Board consideration.

We also note that if there is salinity toxicity, it may be appropriate to address this impairment through the development of a TMDL. Staff will evaluate the toxicity data and make appropriate recommendations for inclusion of Lake Elsinore on the 303(d) list of impaired waterbodies due to salinity toxicity during a future 303(d) listing cycle.

Comment 43
At certain times, phosphorus is the limiting nutrient in Lake Elsinore and at other times, nitrogen is the limiting nutrient. They don't become the limiting nutrient at the same time. To control both requires costly treatment when it may not always be warranted.

Staff Response
See response to Comments 54, 79 and 81 in the September 17, 2004 Staff Report, Attachment B.

Comment 44
Light penetration is also a factor for lake quality and may be a more important factor for controlling algae growth.

Staff Response
See response to Comment 80 in the September 17, 2004 Staff Report, Attachment B.

Peer Review by
Robert Gearheart, Ph.D., P.E., Professor of Environmental Engineering
Humboldt State University, Arcata, California
(Letter dated October 10, 2004)

(Note: Comments are taken verbatim from Dr. Gearheart's letter re "Review of Draft TMDL for Nutrients in Lake Elsinore and Canyon Lake". The comments address two specific studies/assessments and the proposed Basin Plan amendment, as shown below.)

Comments on the Lake Elsinore and Canyon Lake Nutrient Source Assessment Report prepared by Tetra Tech (2003)

Comment 45
"There is no demographic descriptions of the watershed and associated water use, present-future."

Staff Response
At the time the report was prepared, the data were not available to Tetra Tech.

Comment 46
"Was it an objective of this report to allow for WLA to be developed for future land use activities? I don't believe I found any prediction, other than general comments about future land use designation. No mention of the fact that sections of this water shed is one of the fastest urbanized county in the state, for example, with some 10 and 20 years prediction of potential WLA from these changing land uses."

Staff Response
The proposed TMDLs and allocations were developed based on existing land use data and the simulated loads were calibrated with in-stream water quality data. The LSPC model also simulated the nutrient loads in the San Jacinto River Watershed for other scenarios of urbanization: 1) pre-development stage where the entire San Jacinto River watershed was assumed to have nutrient loading and hydrology characteristics respective of forested conditions, and 2) future conditions with land use distributions based on a built-out representation assumed by EMWD (please see page 5-12 of the Nutrient Source Assessment Final Report, Tetra Tech, 2003). The proposed TMDL does not include a specific allocation for future urban areas. If and when new urbanization in the watershed increases and presumably agriculture and/or open space concurrently decreases, the allocations for these sources can be revised to reflect the changes in associated nutrient inputs.

Comment 47
"I am not totally familiar with the area in terms of point source loads from WWTP are there significant loads and /or flows? It would seem that reclaimed wastewater (if treated to a high level) would be the most reliable source of water for use in lake restoration."

Staff Response
The proposed TMDLs include wasteload allocations for recycled water discharges to Lake Elsinore, which are presently authorized on a limited basis (temporally and volumetrically) under an NPDES permit issued by the Regional Board. There are no POTW discharges to Canyon Lake. Staff is unclear what Dr. Gearheart considers as "treated to a high level" –

whether this refers to nutrient reduction or other constituents in recycled water. Staff certainly agree that recycled water is a viable option as a source of supply to stabilize Lake Elsinore, as long as the recycled water does not contribute to nutrient problems in the lake. For that reason, the proposed TMDL specifies nitrogen and phosphorus WLAs for recycled water addition to Lake Elsinore.

Comment 48
"Confusing to me the role of Mystic Lake and Perris reservoir play in the TMDL process. Neither mentions in this section but referred to in section IV. It may assist readers not familiar with the system (this reviewer for example) to have a flow diagram of the hydrological connection of the streams, lakes, drainages, etc."

Staff Response
Comment noted. In addition to the brief discussion in Section 2 of the Tetra Tech Report, watershed hydrology was also discussed in the May 2004 Regional Board TMDL Report (Section 2.1). As described therein, Mystic Lake is an ephemeral lake that is created by the high subsidence rate of the San Jacinto Valley along the San Jacinto fault. During normal to dry years, any water flowing from the headwaters of the San Jacinto River is captured in Mystic Lake; there are no flows to the downstream areas. In very wet years, overflows from Mystic Lake to the San Jacinto River carry flow to Canyon Lake and possibly Lake Elsinore (if there is sufficient flow).

Lake Perris is a Metropolitan Water District Reservoir and is essentially a closed system. Local surface waters flow into Lake Perris and there is no outflow from Lake Perris to the San Jacinto River watershed.

Comment 49
"What is the basis for identifying failing septic tanks, unimpeded access of cattle to stream and unsolicited discharges as not being factors to consider in this report (or did I misinterpret this statement)."

Staff Response
As noted in the Tetra Tech report, septic systems are considered a likely source of nutrients to Lake Elsinore because of their location along the shoreline of the Lake. Further, a high density area of septic systems upstream of Canyon Lake in Quail Valley is also a suspected nutrient source. TMDL regulations and guidance require the evaluation of all existing and potential sources of nutrients and for these reasons, septic systems were evaluated as part of the TMDL development process. Staff realizes that the information and data on septic systems, failure rate, etc. is limited and, accordingly, has added a specific task to the implementation plan to collect this type of data for future refinement of the model and/or TMDL and LA.

With regard to cattle access to the streams, cattle operations in the watershed are confined and cattle do not have access to streams.

Comment 50
"Groundwater sources, cattle contaminated groundwater, and resultant surface water interaction? Fertilizer addition-no mention of groundwater contamination -interaction-surface water? Is there a potential significant load with urban horticultural N and P addition?"

Staff Response
The San Jacinto River is a losing stream; surface water seeps into the ground. The agricultural activities in the watershed, such as cattle ranching, likely contribute to nitrogen to groundwater. However, the groundwater level is several hundred feet below the surface and groundwater does not contribute to surface flow in the main segments of the River. The potential loads from urban horticultural N and P addition were lumped into the total nutrient loads from urban sources The model was calibrated to the in-stream water quality data (based on data representative of urban sampling locations). The exact mechanism of the nutrient delivery from the urban land was not characterized by the model. In developing BMPs or other nutrient control strategies, the urban dischargers may want to do this type of evaluation.

Comment 51
"Were any attempts made to quantify ammonia volatilization from dairies, an atmospheric source?"

Staff Response
No. In staff's opinion, this was not needed to develop the proposed TMDL or WLA for the dairies. As explained in the May 2004 TMDL Report (Section 5.3), staff made assumptions about atmospheric deposition based on data from Anderson et. al (2001, 2003) assuming that atmospheric deposition constituted a small percentage of the nutrient loads to the lakes (see Figures 5-17 through 5-20 in the May 2004 TMDL Report. As part of the phased TMDL effort, atmospheric deposition can be further evaluated.

Comment 52
"Septic tank phosphorus emission calculations-no attenuation of P through the soil column?"

Staff Response
As discussed on pages 4-24 through 4-25 of the Tetra Tech Report, the phosphorus emission calculations were done outside the model. The phosphorus emission rate (load/septic tank) was based the case studies from other areas. The delivery of the phosphorus loads to the streams was simulated by a dynamic hydrologic model that considers the attenuation along the flow paths.

Comment 53
"How is the water used that has been excessively pumped from groundwater? What are the nutrient levels in the groundwater?"

Staff Response
The water pumped from the ground is primarily used for agricultural irrigation and for domestic water supplies. Nutrient contributions from the lands that are irrigated by groundwater, along with activities such as fertilizer application, were taken into account in the model as part of the total nutrient buildup rate in the watershed model.

Comment 54
"Hydrology-wastewater reclamation-groundwater recharge?"

Staff Response
This meaning of this comment is unclear. Treated wastewater is used for irrigation on agricultural land, golf courses, and urban parks. This use was taken into account in the

model development. There are also efforts by EMWD to recharge groundwater with State Water Project water and/or Colorado River waters, however, staff is unclear how or whether Dr. Gearheart sees this as a factor to consider in the TMDL.

Comment 55
"Water balance for the system-specifically the role of ET on Lake Volume-"

Staff Response
The role of evapotranspiration (ET) for the system (watershed and the lake) was simulated in the watershed model (LSPC) and the lake model (EFDC).

Comment 56
"Pollutant representation-Is it not possible or not useful in the eyes of the modelers to have TSS a primary pollutant to consider in the model. It is mentioned, sediment, in the following sentence as a pollutant to consider for future efforts. It seems that the fate of phosphorus specifically could be tracked with sediment."

Staff Response
Yes, it would be useful and possible to simulate TSS as a pollutant. Staff agrees that TSS simulation would be a good indicator for particulate phosphorus. However, the objective of the modeling effort was to simulate the nutrient loads, which is a totally different analytical process and procedure from the TSS simulation. Given time and budget constraints, the TSS simulation could be not be performed for the purposes of TMDL development but could be considered as part of future modeling efforts to refine the TMDLS.

Comment 57
"The nature of the soils (ACS Soil C and D) in and around the reservoirs, would suggest relatively high P adsorption values."

Staff Response
Comment noted.

Comment 58
"Internal loads from reservoir are these sinks a significant factor in modeling In-lake chlorophyll production levels."

Staff Response
The internal loads from the reservoir and the deposition of the nutrients were simulated using a benthic release rate and a simplified 1st order loss equation. The internal loads from a reservoir would be a significant factor in the algal production in Canyon Lake (Anderson *et al.*, 2003). However, the Tetra Tech model did not simulate the chlorophyll production since the objective of the Canyon Lake model was to predict the nutrient loads transported to downstream to Lake Elsinore.

Comment 59
"Model calibration and verification
Graphic analysis of calibration analysis, Fig. 4-22 through 4-25

> The model effort appears to do better for the less extreme flows-what is lost by not have the same confidence for the high flow conditions?
>
> Consistent under prediction of TN and TP not fully explained or accounted for in a sensitivity analysis."

Staff Response

These figures report calibration results for model subwatershed #14, a small, predominately urban watershed located in Hemet. The second paragraph of page 4-36 states that:

> "After closer examination of the landuse in subwatershed 14, it became apparent that approximately 30 acres of agricultural land in the area had a pronounced influence on model predictions. For this subwatershed, the operation of the small agricultural area can be quite different than overall assumptions for agricultural areas throughout the entire San Jacinto Basin. Therefore, the slight over-prediction of total phosphorus was considered acceptable because calibration was appropriate in other areas where agriculture is a dominant landuse."

Model validation was performed for subwatershed 14 and discussed on page 4-38. Additional calibration and validation for urban areas were performed for three subwatersheds (2, 3, and 4) in the Lake Elsinore area (page 4-40). In general, the model predicted TN and TP concentrations within a relative range of observed conditions. Observed concentrations were sparse, with a single sample collected for storms separated by months, whereas model predictions are continuous hourly simulations. Furthermore, many observed data were collected during periods when the model predicted little or no streamflow. Therefore, robust sensitivity analyses to quantify model discrepancy were problematic. Rather, a holistic approach was undertaken to assess model performance graphically with repeated comparison to other locations and time periods in the watershed representative of similar land use distributions.

Comment 60

"Figures 5-7 through 5-10 discussion- have antecedent conditions been considered in the three water year and relative land use assumptions. Limited discussion about these predictions. I would assume this is what the TMDL is all about in terms of source loading. Reoccurrence intervals for these types of water years could be used to develop a loading probability distribution relationship. Not sure what was modified from this report, if any in the draft TMDL amendment."

Staff Response

Antecedent conditions were simulated dynamically at a 1-hour timestep within the modeling system, and are specific to each storm rather than each water year. During dry periods, nutrients were modeled to build-up on the land surface as a function of land use activities, with rates and maximum limits of buildup determined based on literature values and model calibration. Therefore, antecedent conditions are included within model predictions for each annual hydrologic condition (e.g., dry, moderate, or wet year), dependent on the distribution and magnitude of rainfall events that occurred during each year.

Reoccurrence intervals were not considered because such analyses are often specific to storms rather than annual volumes. Only ten hydrologic years were simulated using the

model, based on availability of representative spatial land use data (limited to observations in 1993) that were likely not representative of historic land use distributions, which change with time, required for analyses of historic hydrology. Ten-year simulation resulted in limited information for estimation of annual hydrologic reoccurrence intervals.

Comments on the Internal Loading and Nutrient Cycling in Canyon Lake/Lake Elsinore by Anderson, et. al. (2002, 2003)

Comment 61
"Both of these documents focused on the lake/s nutrient dynamics with the purpose of the determining the effect of WLA's to the total nutrient budget of the system. I did not have sufficient time to review in any detail the assumptions made in the analysis. It does appear, though, that good science was practiced in terms of sampling protocols (spatial representation and replication), statistical implication, and key nutrient fate and transport processes.

I followed the approach taken by Anderson, ET. Al. and support the conclusions drawn from the analysis. Again I did not have time to determine exactly what portion of his findings were modified in the draft TMD. The potential negative impact (P release from sediments) from the destratification of the shallow region of Canyon Lake is highly plausible and should be carefully evaluated."

Staff Response
Comment noted.

Comment 62
"The effect of Ca precipitation on P removal is suggested but not supported by water quality data showing dissolved Ca, Mg, and Fe concentrations. Conclusions reached by Anderson's model in terms of P loading is significant in terms of the reality of reversing the eutrophic process.

The observed reduction of P levels in the lake over the period of the data set is an interesting observation and not fully explained in the report. "

Staff Response
Ca precipitation and removal of P has been demonstrated in hardwater lakes during "whiting" events, although we agree that it is difficult to draw conclusions from dissolved water column data. We do note, however, that Anderson reported higher concentrations of CaCO3 (8-24%) and slightly higher TP (277-1392 mg/kg) in material recovered from sediment traps (Table 5.1 in Final Report to SARWQCB, 2001) than in the sediment, where CaCO3 levels ranged from 0-12.5% and TP ranged from 44-1113 mg/kg (Table 3.1). This does suggest some $CaCO_3$ precipitation and possible PO_4 co-precipitation within the water column.

The observed reduction in TP concentrations within the water column from 1993-2001 is due to net sedimentation.

Comments on the staff report released on May 21, 2004 and the proposed Basin Plan Amendment language submitted to the Board on June 4, 2004.

Comment 63
"The discussion on page 32, and the associated Figure 5-2, suggests that P is not buried in the sediment (as in a long term removal process). Discussion concerning phosphorus in the core samples seemed to deal more with the pore water not the fixed P. Perhaps there was information in the study but I did not find it. Given the type of sediment found in the lake I would guess that some P is driven to an ultimate sink. Even when all of the sediment is detrital material some of the P is buried, example Klamath Lake Oregon. I am not sure it would change the conclusion if it was a factor, but it appears to be missing in the conceptual modeling of the system."

Staff Response
Figure 5-2 shows the P budget for Lake Elsinore during the 2000-2001 period. It is true that over a long period of time (over a decade), the P concentration in the water column does decrease as long as the lake level remains stable. But when the lake level drops, the P concentration in the water column tends to increase in the absence of external sources. This suggests that there is a net release of P from the sediment due to resuspension and flux. The P model used for calculating the P load capacity considered the sedimentation, flux and resuspension processes.

Comment 64
"While it appears to me, given the watershed condition, the climate, the land use activities, and the historic limnological conditions in the lake that there would a strong possibility that the requisite P and N loadings to reduce eutrophic conditions in the lake would not be possible. This is an example where the TMDL has no real application in terms of a likely outcome that removes the impaired water body status. Based upon the increasing pressure of development in eastern Riverside County and the internal load in the lakes the system it is probably non-reversible (Anderson 2002 and 2003)."

Staff Response
The June 4, 2004 Technical TMDL report explicitly acknowledges the difficulties in restoration of Lake Elsinore, given limnological conditions and the long eutrophic history of the Lake (pages 15-16). The numeric targets proposed recognize the virtual impossibility of changing the status of Lake from eutrophic to mesotrophic. However, staff believes that significant improvements can be achieved through implementation of the TMDL. Limnocosm studies have shown that some treatment measures can indeed reduce the internal load (e.g., aeration, alum treatment and metal salt addition). Literature review also suggests that carp removal can reduce the internal loading rate. An increased lake level would also likely reduce the resuspension of organic rich sediment.

Comment 65
"The watershed loading and lake modeling efforts are well done and are representative of models that are commonly applied to conjunctive watershed/lake systems. The verification of the models suffer, as to many models, from lack of data. This is a particular problem with extreme water balance conditions, such as no out flows."

Staff Response
Comment noted.

Comment 66
"I personally would have been interested in knowing more about the ecology of the lakes in terms of algal species, zooplankton species, fish species etc. There was mention of N fixation but little discussion of its temporal and/or spatial implication. Considering the fact that the nutrient balances were on an annual basis these factors might not be significant, but might be interesting in terms of seasonal fluctuations."

Staff Response
The ecology of the lake has been better understood through recent work conducted by Dr. Anderson and his student (Rebecca A. Veiga Nascimento and Michael A. Anderson, 2004, Zooplankton and Aeration Monitoring at Lake Elsinore – Draft Final Report). However, the rate of N fixation has not been determined. There is an ongoing effort to develop a N model for the lake as well.

Comment 67
"The study's support the conclusions that the eutrophic condition of the lakes will remain in an impaired status due to the internal load of P. The nitrogen limiting condition is not fully documented but strongly suggest based on the annual loadings analysis performs in the studies. The recommendation of setting a target of 0. 1 mg/l of P is justified based upon the loading studies but not necessarily ecological supportable in terms of eutrophication processes. Phosphorus levels of 0.08 to 0.010 mg/l are commonly cited as the limiting level for eutrophication.

Staff Response
"See response to Comment 63. Achieving the proposed TP target of 0.1 mg/l would improve the quality of Lake Elsinore but not remove its eutrophic status. Historical evidence suggests that the Lake may be naturally eutrophic; therefore, staff believes it would be infeasible to restore Lake Elsinore into a mesotrophic or oligotrophic lake.

Comment 68
"While there is no real discussion and or feasibility analysis of BPM's and restoration alternatives in these studies there are some options that should be considered. One option would be extract the internal load and external load by processing through wetlands. Since TDS apparently are not a real issue, the P fixed in wetland plants could afford marginal habitat improvement if the water loss could be lived with. This concept would be to find portion of the lakes to restore to habitat value and recreational uses."

Staff Response
Due to the long history of water quality problems of Lake Elsinore caused by eutrophication and to the Lake's unique hydrology, the proposed TMDLs were drafted to give the control measure implementation flexibility to the responsible parties. Regional Board staff has worked closely with LESJWA to evaluate different options to remove nutrients from the lakes. One option that has been evaluated is wetlands treatment. Staff expects to continue to work with stakeholders to identify appropriate nutrient reduction strategies.

Comment 69
"The other types of things being looked at are the effect of certain humic compounds on the phyto-plankton populations. I am assuming blue-green algae are present since there is mention of N fixation. An example of an in-lake treatment for eutrophic bodies of water is

based on the use of humic compounds released from the aqueous decomposition of various plant material. There is considerable literature and operational research activities dealing with barley straw humics in Scotland. There is some evidence that the humics (brown water) from tule wetland perform in a similar manner. Historic references, for example, by Native Americans around Klamath Lake suggest that brown water conditions from leached humic materials reduce blue-green algal populations in the late summer months."

Staff Response
Comment noted. Staff has collected literature materials on the subject that we will make available to LESJWA and other responsible parties for consideration.

Comment 70
"I think there should be some mention of the drought conditions that appear to more of a long-term cycle or possible new status quo condition in the draft TMDL. Given the drought conditions and potential global warming factors some mention should be made on the impact of reclaimed wastewater in the system within the context of the draft TMDL. Perhaps some mention of how reclaimed wastewater can be used to modify the impaired water bodies. When suggesting an interim P level of 1.0 mg/l one is within the economic range of nutrient removal processes in the water reclamation systems."

Staff Response
Staff recognizes that the drought condition is a more frequent phenomenon. Initially, staff did attempt to draft a TMDL that identified load capacities, wasteload allocations and load allocations specific to wet, moderate and dry hydrologic conditions. But this approach proved impractical from an implementation standpoint. Therefore, staff proposes to use a weighted average approach considering the relative frequency of the hydrologic conditions over a 10-year period. As for the reclaimed water discharge into the lake, staff agrees that this is an important source of supplemental water to Lake Elsinore. Staff has proposed a WLA for the recycled water with an interim P effluent limit of 0.5 mg/L.. Staff notes that recycled water discharges in the Great Lakes area have a P limit of 1.0 mg/L . However, Lake Elsinore is a terminal lake located in a mediterranean climate zone with a long algal growing season. The Lake is much more sensitive to nutrient input and a more restrictive wasteload allocation is necessary. In staff's opinion, the interim P limit of 0.5 mg/L for reclaimed water is achievable technologically and economically (see response to Comment 41, above).

Comment 71
"From this reviewers' observation the methods and data sets used in these reports are representative of accepted scientific and engineering procedures and protocols. The report supports the conclusions and recommendations with the exception of the role of P fixation in the sediment via precipitation/adsorption processes. The only caveat is that there is no analysis of BM'P's to meet these loads in terms of effectiveness, reliability, level of participation, and spatial and temporal application. I would tend to be very pessimistic in terms of being able to reverse the impaired nature of these water bodies in both the interim (2015) and final (2020) time frame."

Staff Response
Comment noted. Also see response to Comments 64 and 68.

ATTACHMENT C

ENVIRONMENTAL CHECKLIST

I. BACKGROUND

1. **Project title:** *Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore in the San Jacinto River Watershed*

2. **Lead agency name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

3. **Contact person and phone number:** *Hope Smythe (909) 782- 4493*

4. **Project location:** *San Jacinto River Watershed, Riverside County (all or portions of Idyllwild, Hemet, San Jacinto, Perris, Moreno Valley, Canyon Lake, Lake Elsinore, Beaumont, and Murrieta)*

5. **Project sponsor's name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

6. **General plan designation:** *Not applicable*

7. **Zoning:** *Not applicable*

8. **Description of project:** *Adoption of a Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore. The TMDLs establish wasteload allocations and load allocations for allowable nutrient inputs by all identified sources that discharge to Canyon Lake and Lake Elsinore. The intent is to achieve numeric, water quality targets that will protect the beneficial uses of the lakes. The Basin Plan amendment includes an implementation plan that details the actions required by the Regional Board and other responsible parties to implement the TMDL.*

9. **Surrounding land uses and setting:** *Not applicable*

10. **Other public agencies whose approval is required:** *The Basin Plan amendment must be approved by the State Water Resources Control Board, the Office of Administrative Law, and the U.S. Environmental Protection Agency before it becomes effective.*

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☐ Noise	☐ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation / Traffic
☐ Utilities / Service Systems	☐ Mandatory Findings of Significance	

II. DETERMINATION

On the basis of this initial evaluation:

X I find that the proposed project COULD NOT have a significant effect on the environment.

___ I find that the proposed project MAY have a significant effect on the environment. However, there are feasible alternatives and/or mitigation measures available that will substantially lessen any adverse impact. These alternatives are discussed in the attached written report.

___ I find that the proposed project MAY have a significant effect on the environment. There are no feasible alternatives and/or feasible mitigation measures available that would substantially lessen any significant adverse impact. See the attached written report for a discussion of this determination.

Signature 10-28-04
Date

Gerard J. Thibeault
Executive Officer

III. ENVIRONMENTAL IMPACTS

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS - Would the project:				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				X
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?				X
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X
III. AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X
IV. BIOLOGICAL RESOURCES - Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?				X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES - Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in ¤15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to ¤15064.5?				X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Disturb any human remains, including those interred outside of formal cemeteries?				
VI. GEOLOGY AND SOILS - Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?				X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
VII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
VIII. HYDROLOGY AND WATER QUALITY - Would the project:				
a) Violate any water quality standards or waste discharge requirements?				X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
X. MINERAL RESOURCES - Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
XI. NOISE - Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
residing or working in the project area to excessive noise levels?				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
XII. POPULATION AND HOUSING - Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection? Police protection? Schools? Parks? Other public facilities?				X
XIV. RECREATION - Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X
XV. TRANSPORTATION/TRAFFIC - Would the project:				
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS - Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X
XVII. MANDATORY FINDINGS OF SIGNIFICANCE -				

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				X
b) Does the project have impacts that are individually limited, but cumulatively considerable? ('Cumulatively considerable' means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				X
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?				X

Attachment - Environmental Checklist

Discussion of Environmental Impacts

Explanation of Environmental Checklist "Less than significant" Answers

Note: Adoption of the Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore will not have any direct impact on the environment. Implementation of actions necessary to achieve the TMDLs may affect the environment, as described below. However, the intent of TMDL implementation is to restore and protect the water quality of the lakes and their beneficial uses. Any potential adverse environmental effects associated with TMDL implementation will be subject to project-specific CEQA analysis and certification to assure appropriate avoidance/minimization and mitigation.

I. Aesthetics (a)

The proposed TMDLs call for reductions in nutrient loads to the lakes, which may include the implementation of BMPs that could be aesthetically unpleasing.

IV. Biological Resources (c), (d)

The proposed TMDLs call for actions to reduce internal nutrient loading to the lakes, which may include fishery management and sediment removal. Such actions would clearly affect, or have the potential to affect, the biota. Any such actions would be subject to specific CEQA analysis and certification, and would be intended to restore and protect the biological resources of the lake. In addition, BMPs or treatment measures constructed to reduce nutrient loads to the lakes may require large land acquisition. Such land may include those currently supporting riparian habitat or sensitive species. Any such actions would be subject to specific CEQA analysis and certification, and would be intended to restore and protect the biological resources of the lakes and San Jacinto River watershed.

XI. Noise (d)

Implementation of actions necessary to implement the proposed TMDLs may result in increases in noise levels. However, these effects are expected to be limited in scope and duration and are not considered significant. Again, proposed implementation actions would be subject to specific CEQA analysis and certification.

XVI. Utilities and Service Systems (b), (c)

The proposed TMDLs call for reductions in nutrient contributions to the lakes from septic systems and storm drainage systems. To achieve these reductions, modifications to the storm drainage system may be necessary. Similarly, it may be that septic system modifications, or connection of existing septic systems to sewer systems, will be necessary. Connection of existing septic systems to sewer systems may require collection and/or wastewater treatment plant modifications/expansions, with attendant construction-related environmental effects. In addition, wastewater treatment plant modifications may be needed to meet the nutrient wasteload allocations. Any such projects associated with septic, sewer or storm drainage systems modifications would be subject to further, case-specific environmental review and certification.

ATTACHMENT D

COMMENT LETTERS

EASTERN MUNICIPAL WATER DISTRICT
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September 16, 2004

Mr. Gerard J. Thibeault, Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Subject: Tentative Resolution No. R8-2004-0037: Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake.

Dear Mr. Thibeault:

Thank you for the opportunity to review and comment on Tentative Resolution No. R8-2004-0037: Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake. As the second review of this document , it should be noted that several of our concerns were not satisfactorily addressed in this revision and these comments are included for your reconsideration. Our comments are as follows:

As a general comment, the revised TMDL sets a numeric target limit for both phosphorus and nitrogen. These numeric target levels are for the lake and as there is no assimilative capacity in the lake, it is our understanding that these target levels will be included in the discharge permits. The cost associated with meeting these numeric target levels are significant. Although, it's stated that they are numeric targets, in reality it's planned on being used as a water quality objective. Water Code Section 13241 provides that the Regional Board shall consider economics, as one of the factor in the establishing water quality objectives. EMWD believes it is necessary when a numeric target is used as water quality objective that an economic analysis be performed before imposing such a standard on a discharger. Your response to comments states that "Data deficiencies are explicitly acknowledged and reflected in the proposed compliance schedules and implementation plan requirements for monitoring (including the collection of wet-weather data), model updates and periodic review of the TMDLS to consider appropriate refinements." The dischargers will be held to the numeric targets as permit limitations while the TMDL will adjust when the

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (951) 928-3777 Fax: (951) 928-61
Location: 2270 Trumble Road Perris, CA 92570 Internet: www.emwd.org

data deficiencies are accomplished. It would make sense that the discharger not be held to the numeric target until these data deficiencies have been met for the numeric targets have the potential to change based on this analysis. It is EMWD's position that there still is not enough information to move forward with interim and final load and waste load allocations for the Lake Elsinore TMDL and use of the numeric target as a water quality objective. Given that the first interim target is not effective until 2015, there would appear to be ample time to gather additional information such as the effects of wet weather events, recycled water additions to the lake and in-lake treatment systems such as lake mixing and aeration projects. The additional data gathered would provide a sounder basis for the development of the target allocations.

At the workshop, the option to mitigate or pollutant trade has been raised as an option available for the dischargers in the watershed. In concept this seems like a viable option, but again, this is an area that has not been used in California and is essentially new territory for your office and the watershed. It seems that no one can meet the numeric targets and as such, all will be looking into mitigation and pollutant trading. Although not confirmed through analysis, EMWD is concerned that the available mitigation projects will not meet watershed demands necessary to reach the numeric targets. We recommend that time be provided to evaluate the viability of pollutant trading and offset mitigation.

Additionally, EMWD would support the continuation of the pilot project for use of supplemental water during the dry weather to ensure and stabilize the lake level. As currently proposed without the pilot project, adoption of the TMDL would effectively prevent EMWD from contributing any recycled water to Lake Elsinore. EMWD's discharge permit to Lake Elsinore would include permit limitations for nutrients that EMWD cannot meet without significant treatment costs. There is evidence from the UCR study conducted by Dr. Anderson that recycled water addition's benefit the lake. While there is a statement that prolonged and increased external loading will exacerbate long-term internal loading, there is also recognition that stabilizing the lake level is of greater short-term importance than nutrient loading. The report states that "The poorest water quality observed in the lake was more closely associated with the declining lake level than recycled water inputs or high lake nutrient concentrations."

The response to comments dismissed our cost estimate for upgrading the Temecula Valley Regional Water Reclamation Facility (TVRWRF) to meet the nutrient criteria of 1.0 mg/L and 0.1 mg/l for nitrogen and phosphorus, respectively. These costs were taken from a report developed for EMWD by Carollo Engineers entitled "Live Stream Discharge Alternatives, TVRWRF, EMWD." The cost of $37M is the present value cost for capital ($24M) and operations ($13M) to meet the specified nutrient criteria for 8 MGD. The treatment process includes both chemical and biological nutrient removal; the report further states that these processes cannot guarantee the effluent quality. Additionally, the TVRWRF is being expanded to 18 MGD and the $37M is for only 8MGD, therefore the cost

to remove nutrients will increase proportionally as the plant expands. As clarification, the costs used in the staff report for EMWD upgrades were based on the CH2MHill report developed by LESJWA, and stated that these costs were more accurate than the costs EMWD presented at the Board meeting. The cost estimates in the LESJWA report were for phosphorus removal only, excluding nitrogen removal. Using the LESJWA cost estimates does not capture the magnitude of costs associated with meeting the proposed numeric targets.

Listed below are specific comments on the Resolution No. R8-2004-0037:

- Page 4: The phosphorus and nitrogen numeric targets listed in Table 5-9n are set at levels that cannot be attained without significant treatment costs and it is requested that an economic analysis be included in the TMDL.

- Page 7: It is our understanding that the waste load allocation for supplemental water is based on total phosphorus of 0.2 mg/l, however, Table 5-9r for the final total phosphorus appears to set at 0.1mg/l.

- Page 8 D – The last paragraph states that, "Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur." This is a broad statement that does not take into account the cost of achieving the numeric targets and other lake dynamics, such as, low lake level that may impact the aesthetics of the lake.

- Tasks 3.1, 3.2, 8, 10, and 11 – EMWD is listed as a responsible party for the studies associated with these tasks. Due to the significant costs associated with the meeting numeric targets, it may not be feasible for EMWD to provide supplemental water to the lake. If EMWD cannot participate, then EWMD should not be listed as a responsible party.

Thank you for the opportunity to participate in the TMDL process. Should you have any questions, please contact Jayne Joy at (951) 928-3777 ext. 6241 or David Morycz at ext. 6325.

Sincerely,

Anthony J. Pack
General Manager

WARREN D. WILLIAMS
General Manager-Chief Engineer

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

October 13, 2004

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality
Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Dear Mr. Thibeault:

Re: Comments on Draft Lake Elsinore and Canyon Lake Nutrient TMDL and Basin Plan Amendment

The Riverside County Flood Control and Water Conservation District (District) is the Principal Permittee on the Riverside County municipal separate storm sewer system (MS4) permit. The District is submitting the following comments on the Draft Lake Elsinore and Canyon Lake Nutrient TMDLs and Basin Plan Amendment (BPA) released September 3, 2004.

Adaptive Management

During the June workshop, several issues were raised by the District and other stakeholders regarding the feasibility of the TMDL. As you noted at the close of that workshop, the Regional Board is effectively being required to implement legal requirements without practical solutions. In recognition of this, however, Regional Board staff has made efforts to provide flexibility to the TMDL by incorporating adaptive management concepts. The adaptive management concepts are premised on allowing the science upon which the TMDL is based to continue to develop, then allowing for review and modification of the TMDL based on the improved science at specified future dates.

Adaptive management requires the ongoing participation and coordination of all stakeholders, including Regional Board staff. It also requires that the TMDL incorporate language identifying likely and potential deficiencies with the TMDL so that:

- Future Regional Board members reviewing revisions of the TMDL clearly understand that the existing TMDL was adopted with reservation;
- Stakeholders can justify expenditures of funds to support development of the science in those areas where the TMDL is understood to be deficient;
- Regional Board staff can continue to justify expenditure of staff time and resources to support the stakeholders efforts to revise and improve the TMDL, including justification of expenditures for future Basin Plan amendments; and

- The stakeholders are allowed to apply for grants to further develop the science and technology necessary to address TMDL deficiencies, including lack of technology to address the problem.

Without this clear and transparent understanding of the known and potential deficiencies, it is likely that the adaptive management concepts will fail as those most familiar with the TMDL problems move on and current informal agreements and understanding are lost or forgotten. Recent reviews of Basin Plans for other Regional Board regions, including the Los Angeles Region, clearly indicate this potential for failure. These reviews of the administrative record for the aforementioned Basin Plans identify Basin Plan Amendments where Regional Board staff adopted inappropriate or tentative Water Quality Objectives for various waterbodies. The Water Quality Objectives were adopted to meet deadlines with the intention of reviewing them at a future date when more resources and time were available. In many cases, those staff members involved with the Basin Plan moved on and the intentions were forgotten, leading to presumptions by subsequent Board Members and staff that these Water Quality Objectives were appropriate and properly vetted prior to adoption. To avoid the mistakes made in other regions, it is important that the TMDL Basin Plan Amendment and Technical Support document clearly and transparently identify deficiencies.

To date, Board staff has made outstanding efforts to work with stakeholders to develop the TMDL, to incorporate adaptive management concepts, and to address stakeholder concerns. It is for this reason, that despite the District's position that the TMDL is both economically and technologically unachievable, we are willing to look past these deficiencies and participate in a cooperative effort with other responsible parties. However, the District believes that the following concepts and data need to be incorporated into the TMDL to ensure that known and potential deficiencies are clearly understood by present and future stakeholders.

Scientific Limitations

The District requests that the following discussion be appended to the end of the Introduction of the Technical Report:

In summary, the science supporting the interim and final TMDL numeric targets for total phosphorous and final TMDL numeric target for total nitrogen (numeric targets) proposed in the BPA is preliminary. Where science was lacking, Staff selected numeric target values conservatively for nutrients. The ability of the TMDL to achieve these standards has been called into question by the Regional Board's own peer reviewer, Dr. Josselyn:

> "The proposed targets rely heavily on controls for internal nutrient cycling for Lake Elsinore which may not be achievable for practical and methodological reasons. The [Regional Board] staff needs to demonstrate that such technologies as suggested could actually work in this system."

Although Dr. Josselyn indicated an alternative approach would be to require additional nutrient reductions in the upper watershed, several stakeholders, including the Riverside County Flood Control and Water Conservation District, have provided evidence that currently available technologies are not capable of addressing the proposed interim and final numeric targets for nutrients.

There is some concern that Lake Elsinore cannot naturally support the beneficial uses assigned to it. As stated by Dr. Josselyn:

> "I concur with the statements that the Lake is naturally eutrophic given the observations of fish kills previously and the terminal nature of the Lake in this watershed...The targets for phosphorus as proposed reflect both the 'natural' eutrophic nature of Lake Elsinore, the reality of the high levels of phosphorus regeneration from the sediments, and the practicalities of trying to 'treat' sediments in-situ. The shallow nature of the lake leads to wind resuspension [a major source of phosphorus regeneration] that cannot be controlled."

It is clear that further analysis and review of the TMDL is necessary. If the additional science and analysis does not indicate that more assimilative capacity is available in the lakes, then a review of the Basin Plan Beneficial Uses may be in order to determine whether the existing designated beneficial uses for the lakes can be supported by natural conditions. The State Water Resources Control Board has issued draft guidance that indicates that standards should be revised based on attainability:

> "If the failure to attain standards is due to the fact that the applicable standards are not appropriate to natural conditions, an appropriate regulatory response is to correct the standards" (December 2003 State Board Draft Water Quality Control Policy for Addressing Impaired Waters)

It is Staff's expectation that the phased analysis proposed by this TMDL will lead to the identification of additional assimilative capacity in the lakes and upper watershed.

Legality

The legal basis for the TMDL requirements is not clear. Although the District does not contend the right of the Regional Board to adopt a TMDL to regulate discharges to impaired receiving waters, the regulatory authority to require "retroactive clean up" of the sediments or nutrients in the lakes does not appear to exist in either the Clean Water Act or Porter-Cologne. The District requests that the authority to regulate the removal of sediments from the lakes by the upstream stakeholders be cited in the TMDL basin plan amendment. Without this authority, the Regional Board must assign Tasks 8 and 9 to place responsibility solely on the entities who own the lakes.

Staff's contention that the proposed numeric targets are only interpretations of existing water quality standards and not Water Quality Objectives does not comport with California Water

Code. Upon adoption, the numeric targets would carry the weight of water quality objectives. The District supports EMWD's June 3 verbal comments regarding this issue.

The recent Superior Court ruling in City of Arcadia *et al* versus The SWRCB and Los Angeles Region RWQCB (December 24, 2003), states that any amendment of a Basin Plan, independent of whether it adopts water quality objectives is subject to Section 13241 of the California Water Code. Despite the appeal of this decision, the District holds that the Superior Court ruling was consistent with the intent of the law.

Are Permittees required to meet the same concentrations as specified in the Lakes?

Current nutrient BMP technologies, particularly those referenced in the September 17th Regional Board staff report are not capable of economically or technologically addressing the volume of water generated during a wet year. These BMPs are generally sized to treat flows from the average annual storm event and would short-circuit during wet year events. However, wet years are the only years that the upper watershed stakeholders contribute significant nutrient loads to Canyon Lake and Lake Elsinore. If the wet years cannot be treated, compliance with the interim phosphorus target for the TMDL is mathematically impossible for discharges to Canyon Lake. The following table clarifies this:

Allowable and Existing TP Discharges for Upper Watershed Stakeholders (Urban, CAFO, Agriculture, Open/Forest, Septic) to Canyon Lake

1. Allowable Annual TP Load for Upper Watershed	3,844 kg/yr
2. Cumulative 10 yr. Allowable TP Load	38,444 kg
3. Estimated Existing TP Load for Wet Year	43,031 kg/yr
4. Estimated Cumulative Existing TP Load for 1.6 Wet Years	68,849 kg
5. Mandatory Minimum TP Load Reduction for Wet Year (Row 4 – Row 2)	30,405 kg
6. Mandatory Minimum TP Load Reduction to Allow 1674 kg/yr [existing dry year TP discharge) TP discharge during 8 non-wet years (Row 4 – (1674*8)]	43,797 kg
7. Allowable Wet Year TP Load based on Row 6 (Row 4 – Row 6)/1.6 wet years	15,657 kg/yr
8. Estimated volume of flow during a typical wet year	139,345 ac ft
9. Mandatory Minimum Concentration for Influent to Canyon Lake From Upper Watershed	0.09 mg/l
10. Interim Target for TP Concentrations at Canyon Lake	0.10 mg/l

It is clear from the table that a single untreated wet year would exceed the entire 10-year allowable TP load for the upper watershed stakeholders. As stated before, this event is economically and technologically impossible to treat. Further, this statistic is particularly disconcerting considering that 1.6 wet years, or enough TP to generate nearly twice the allowable TP load to Canyon Lake are expected in a given 10-year compliance period. In order to allow a TP load of 1674 kg/yr into Canyon Lake during non-wet years, the wet year events MUST be reduced by approximately 63% to an allowable TP load of 15,657 kg into Canyon Lake. Based

on a the wet year storm volume of 139,345 ac ft, a concentration of 0.09 mg/l, or slightly less than the interim 0.1 mg/l concentration required in-lake must be achieved. Again, as stated in our June 3rd letter, this is neither technologically nor economically feasible for dry or moderate years, much less during the extreme storm volume of a wet year.

In addition, as stated in our June 3rd letter and as supported by Dr. Josselyn's peer review of the TMDL, the ability of the available in-lake treatment technologies to meet the 30% and 70% load reductions is suspect at best. As noted by Dr. Josselyn, "the reduction levels for phosphorus sought for Lake Elsinore rely significantly on proposals that have not been tested for their effectiveness in this particular situation". Although Dr. Josselyn notes that alum may be an alternative treatment mechanism, current chemical conditions in Lake Elsinore are not ideal for alum addition; flocculation and sedimentation processes require lower pH levels than currently exist in Lake Elsinore in order to achieve successful phosphate removal.

Cost Estimates

Based on the EPA's Urban Nutrient Reduction BMP Costs (1999) referenced in the Regional Board Staff Report, the following table estimates the costs associated with the construction of nutrient reduction BMPs in the San Jacinto River Watershed to address the wet year flow volume (139,345 ac ft or approximately 6 billion cubic feet). The cost estimates below presume each stakeholder in the watershed tributary to Canyon Lake would implement the specified BMP. Urban Stakeholder BMP costs, based on a rough estimation of land use (both urban areas and non-urban areas tributary to urban systems) and runoff rates, could represent between 50-60% of the total cost identified below:

BMP Construction Costs to Treat Wet Year Flow

BMP	EPA, 2003 $s (per ft^3 treated)	Cost, 2003 $s ($V_{wet}$ = 6 Billion ft^3)
Constructed Wetland	$0.60 - $1.13	$ 3.6 B – $ 6.78 B
Infiltration Trench	$4.00	$ 24 B
Infiltration Basin	$1.18	$ 7.08 B
Sand Filter	$2.72 - $5.96	$ 16.3 B – $ 35.7 B
Bioretention	$4.79	$ 28.7 B
Retention & Detention Basin	$0.45 - $0.90	$ 2.7 B – $ 5.4 B
Grass Swale	$0.45	$ 2.7 B
Filter Strip	$0.00 - $1.18	$0 – $ 7.1 B

In addition, costs are provided for BMPs to treat moderate year events:

BMP Construction Costs to Treat Moderate Year Flow

BMP	EPA, 2003 $s (per ft^3 treated)	Cost, 2003 $s ($V_{mod}$ = 253 M ft^3)
Constructed Wetland	$0.60 - $1.13	$ 152 M – $ 286 M
Infiltration Trench	$4.00	$ 1,000 M
Infiltration Basin	$1.18	$ 299 M
Sand Filter	$2.72 - $5.96	$ 688 M – $ 1,500 M
Bioretention	$4.79	$ 1,200 M
Retention & Detention Basin	$0.45 - $0.90	$ 114 M – $ 228 M
Grass Swale	$0.45	$ 114 M
Filter Strip	$0.00 - $1.18	$0 – $ 299 M

The above table does not include land acquisition, design, geotechnical testing, legal fees, and other unexpected or additional costs such as maintenance and operation of each BMP. It should be noted that in the arid climate of the San Jacinto River Watershed, BMPs such as constructed wetlands, grass swales and filter strips would require a reliable year-round supply of water, aside from storm and urban runoff, in order to operate. It is clear from the above referenced tables that it is neither economically nor technologically feasible to treat either the wet and/or moderate year flows. In addition, none of the BMPs referenced above are guaranteed to meet the 0.09 mg/l phosphorus concentration required of wet year discharges to comply with TMDL interim targets. The District would also note that the costs for constructed wetlands identified above are commensurate with our June 3rd cost estimates for wetlands.

Newport Bay TMDL

Several references have been made at the stakeholder and Regional Board workshops regarding the success of the Newport Bay Nutrients TMDL. Although Orange County (OC) has had great success with achieving nutrient TMDL targets in Newport Bay, the OC-Permittees have noted that nitrogen concentrations in their upper watershed can exceed 10 mg/l TN and that they have been able to reduce nitrogen concentrations to 2 mg/l. The OC-Permittees estimate expenditures of approximately $5 million per year in capital and operational costs in order to achieve the nutrient targets. Stormwater discharges in the San Jacinto Watershed average 2-5 mg/l TN and stakeholders in this watershed will be required to reduce nitrogen concentrations to 0.75 mg/l. The TMDL programs are not numerically comparable – the proposed runoff concentrations to be achieved in the San Jacinto Watershed are significantly lower and economically unachievable under the best available BMP technologies. Further, treatment efficiency for available nutrient treatment BMPs diminishes as the effluent concentration is reduced and as the influent concentration approaches the required effluent concentration. The costs neither balance nor justify the anticipated benefits.

Additional Proposed Recommendations

The District believes that the following recommendations would reasonably address the current deficiencies in the TMDLs:

1. Set narrative targets for nutrients since the TMDL is predicated on numeric targets that are intended to be more flexible than Water Quality Objectives. Another alternative is to consider the adoption of narrative targets for TP and TN. The narrative nutrient targets could require that discharges from the upper watershed not lead to exceedances of numeric dissolved oxygen concentration targets established for the Lakes; this would provide the stakeholders with additional flexibility to address the algal problems in the Lakes and would ensure that they are not penalized for non-compliance with an arbitrary numeric target;

2. The Regional Board should facilitate the stakeholder organizational effort by clearly identifying all responsible parties, including agricultural entities in either the Technical Report or the Basin Plan.

3. The Regional Board should also clearly identify in the Basin Plan the regulatory tools, such as NOV's, written requests or other actions that can be utilized to assist the stakeholders in gaining the support of the various responsible parties. The list should also identify how these tools may be used to ensure cooperation in and compliance with this proposed TMDL. For instance, how will regulatory tools be applied to assure all responsible parties financially support the joint monitoring requirements and the formulation and implementation of the Lake Sediment Nutrient Treatment requirements?

4. The Regional Board provide a launching point for TMDL implementation by recommending a fair and rational basis for allocating financial responsibility among all parties.

5. The compliance schedule for joint tasks should be extended by at least one year to accommodate the formation of a stakeholder organization, allow time for stakeholders to secure funding, and provide time for necessary consultants to be selected and contracted with.

6. If further analysis indicates that the lakes are naturally eutrophic, and thus the applicable standards are not appropriate to the natural conditions, the Regional Board should support a Use Attainability Analysis, or other appropriate mechanism, per the Water Quality Control Policy for Addressing Impaired Waters, to revise designated Beneficial Uses for the lakes.

Summary

It is critical that the adaptive management process succeeds, especially upon careful consideration of the cumulative cost of the current and future TMDLs affecting stakeholders in the San Jacinto Watershed. Failure of the adaptive management program for this TMDL may require watershed stakeholders to unnecessarily expend billions of dollars toward a solution-less problem. Funds unnecessarily spent on this TMDL will also subtract from the stakeholders' abilities to respond to future TMDLs that could provide measurable benefits to receiving waters. The District believes that the aforementioned recommended changes are necessary to ensure that this adaptive management process succeeds.

If you have any questions, please contact Stephen Stump at 951.955.8411 of our Regulatory Division.

Very truly yours,

Michael D. Rauson

for WARREN D. WILLIAMS
General Manager-Chief Engineer

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PC/90371

Elsinore Valley Municipal Water District

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October 13, 2004

Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3339
Attention: Cindy Li

SUBJECT: Comments on Canyon Lake and Lake Elsinore Nutrient TMDLs

Dear Ms. Li:

The Elsinore Valley Municipal Water District (EVMWD) appreciates the work of the Regional Water Quality Control Board, its staff, and consultants on the Proposed Lake Elsinore and Canyon Lake TMDLs. The work has been a major effort, but appears to remain controversial because of the unique nature of the lakes. It may be that because the lakes are so far down the health scale that there is an instinct to revive them to good health with the tools at hand, namely TMDL's. Since Lake Elsinore is a naturally eutrophic lake, this may not be possible. All the studies to date include assumptions which when applied to water quality present insurmountable implementation problems because of costs and the unpredictability of nature. Setting standards that are costly and may be impossible to meet must include even greater State participation. The State needs to provide proof and certainty of the result of the requirements which if not achieved could become punitive to the same dischargers and stakeholders working with the RWQCB on this TMDL process. The staff "Response to Comments" for the September 17, 2004 workshop provide good dialog but require further discussion. In the spirit of furthering that dialog, EVMWD offers the following comments:

GENERAL

The TMDL proposal has some excellent points and attempts to solve a difficult situation in morphometrically eutrophic Lake Elsinore. However, several factors about the current lake are unique and artificial causing the management for maximum public benefit to conflict with some recommendations made in the TMDL. The TMDL could be improved in several ways. These primarily include a more realistic appraisal of the lake's potential for beneficial uses, recognition of the overriding need for a stable water level and reduction in fish kills and malodor.

The TMDL process is designed to restore polluted lakes to their original state by reducing nutrient inputs to levels that restore historical water quality, or at least some level above historical that is tolerable. The TMDL

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recognizes that the TMDL process has difficulty in trying to reverse eutrophication in Lake Elsinore since it is a *naturally eutrophic* shallow lake with a large watershed. Unlike most lakes, the role of nutrients (and thus TMDLs) in Lake Elsinore are subordinate to lake level or the climate. Because of nutrient minimal impact, it is unlikely that the TMDLs as proposed will bring any noticeable change in beneficial use. However, the lake may be improved, not by just the traditional methods of imposing more restrictive TMDL values. The LESJWA Biomanipulation Plan that is dependent on a series of mechanical capital facilities is a nontraditional approach by providing appropriate lake ecology and managing and balancing the lake food web to control dominate species such as algae and carp.

The N, P, and chlorophyll *a* standards are unrealistically low for a lake with such a high ratio of watershed to lake surface area, especially since the lake has been artificially reduced in size by 50%. These three targets are not helpful. The targets are not reflective of the historic eutrophic nature of the Lake. LESJWA is currently studying lake sediment 10 meter deep core samples which have been dated to be between 8,000 and 11,000 years old. Nutrient studies of this core material are currently underway which could reveal the "natural" past of Lake Elsinore and should affect TMDL limits.

The current numerical TMDL targets for Lake Elsinore do not provide acceptable water clarity or protection from fish kills or malodor. More stringent TMDL targets are simply not attainable. The proposed targets for DO throughout the water column seems to be all that is required to protect beneficial uses at present. The UCR lake model indicates that an increase of water level will do more than any watershed TMDLs and conversely, a reduction in water levels will overwhelm any TMDLs. If numerical targets are set for N, the use of the TN as a numerical target should be avoided since TN in Lake Elsinore is dominated by biologically inert organic-N. The use of biologically available TIN (Total Inorganic Nitrogen = ammonia + nitrate) is suggested to replace TN. The use of TIN would change the T:P ratios and potential BMPs in the watershed. This TIN change should also be made in the Basin Plan.

The issue of a stable and high lake level, which exceeds water quality in importance, is not addressed adequately. The only discussion of lake levels in sections 2.1, 3.1 and 6 relate to the wide variation of levels, the lake drying out, that fish kills are related to low lake levels and that lake levels are used in the nutrient modeling of the lake. There does not seem to be any discussion of the effects of lake level on the overall health or chemistry of the lake and the relationship to setting TMDL's. Admittedly, lake level versus water quality has not been a part of most TMDL considerations, but Lake Elsinore is unique in this respect. However, the existing beneficial uses can be achieved by other methods, primarily by lake management and biomanipulation. The potential methods were given in the 2002 EVMWD NPDES permit application. Most importantly, good water clarity (> 2 m Secchi depth) is only achievable with biomanipulation that requires a relatively stable water level. The TMDL document will provide only ~ 0.5 to 1 m Secchi depth even if the TMDL targets are reached. A Secchi depth of 0.5 to 1 m is not an acceptable value for public water contact recreation. Finally, the controversial lake level

versus fish kill relationship (or lack of same) should be addressed in a more balanced way.

Environmental Checklist

In section VIII b) under Hydrology and Water Quality "no impact" is listed as to the effect on lowering or depleting groundwater supplies. EVMWD is in the process of adopting a Groundwater Management Plan in compliance with AB 3030. The final draft shows that without adoption of carefully managed basin with proposed implementation of conjunctive use, cumulative overdraft of the basin is expected. If use of the Island wells as part of the source of water for the lake is a mitigation requirement, the impact could contribute to overdraft of the groundwater basin. Review of the Final Draft Elsinore Groundwater Basin Management Plan should be done prior to adoption of the TMDL (CD enclosed).

Nutrient Load Model

The model is used to determine the nutrient loads allowable within the Lake and allocated to various sources. As these models have been established with more normal flow through lakes, caution must be taken and explained when being applied to shallow terminal eutrophic lakes. The Total Phosphorus (TP) limit has been conservatively set at 0.10 mg/l which is the 25th%-ile for a period of data. The 25th%-ile is used to provide a Margin of Safety (MOS) to prevent the load allocations providing too much pollution. If a 50th%-ile is used the MOS is still sizeable at 100% as half of the data points are safely below the estimated standard instead of 3X as many data points being above as below for the 25th%-ile. On the nomographs provided in figure 6-1 and 6-2 using 0.12 mg/l instead of 0.10 mg/l, the TP load capacity would increase by 10,000 kg/yr which is very significant when compared to the 2015 TMDL of 28,584 kg/yr. We believe a closer look at the MOS assumptions, especially for the interim 2015 WLA would be beneficial and could be the subject of further refinement as the future studies are completed before 2015.

There may need to be another look at selecting 1994 as the moderate year for modeling. It may make sense from a hydraulic point of view, but from a nutrient loading perspective it is anomalous in that it follows one of the highest flood years on record. Watershed conditions may not be similar to in-lake conditions that have been altered by cumulative effects of irregular prior years.

RECOMMENDATION SUMMARY (in order of priority)

1. A target water elevation of 1240 - 1246 ft. should be set as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 20 - 26 ft water depth.
2. Biomanipulation and in-lake TMDL management targets (methods) should be set in place of numerical N, P, chlorophyll, or Secchi targets (concentrations) at least in the short-term. This would allow time to evaluate the results of LESJWA's adaptive management approaches.

3. No target for in-lake nutrients (nitrogen and phosphorus) should be set with the exception of the Health Department rule of less than 10 mg/L as N for Canyon Lake (for drinking water source protection).
4. Nitrogen be defined as biologically available Total Inorganic Nitrogen (TIN) not Total Nitrogen (TIN + biologically unavailable organic-N) in-lake targets and lake models.
5. Phosphorus should be defined as either 80% Total Phosphorus (TP) or biologically available TP (most forms of P except apatite, calcium phosphate).
6. The lake level versus fish kill section should be reconsidered in the light of the lake model now available and with consideration of other options.

DISCUSSION OF THE PROPOSED TMDLS

The problems of Lake Elsinore include both conventional and rather unique elements. The lake itself functions uniquely, since for most years it functions as a sump for the watershed. Yet, sporadically, it functions as a flow-through water body. The lake has not been well studied over many years in the way that many other lakes have been examined. Thus, the TMDL has to extrapolate in some areas and make suggestions based on little data in others. These limitations are admitted in the TMDL. Although the extrapolations are often correct, in some areas they are questionable. This review discussed some of the questionable extrapolations and suggests alternatives.

Recommendation 1. Establish water elevation (minimum water depth) and small variation in water depth as prime targets for the TMDLs.

It has not been customary for TMDLs to consider water depth as a prime numerical target. This is because most lakes have a small variation in depth over the season and over decades. Lake Elsinore is an outlier in this respect and naturally dried out every generation or so. The TMDL shows that in-lake nutrient concentrations vary dramatically as the lake level rises and falls with the natural drought cycles of the semi-arid southwest USA. Even with almost no inflow (ideal zero daily loads), the water quality falls. Thus, the traditional TMDLs in the watershed play a small role in the beneficial uses of the lake.

The Lake Elsinore Recycled Water Project Draft Final Report (Anderson, August 2004) suggests that "...stabilizing the lake level may be of greater short-term concern than increasing nutrient concentrations." The Fisheries Management Plan for Lake Elsinore (EIP Associates, 2004) states that "...the success of the (fishery management plan) relies in part on the success of other enhancement measures...for example, lake stabilization."

The TMDL report should consider the reality of the role of water level in the lake. While no one wants large amounts of nutrients to be delivered to Lake Elsinore, there is no good way to provide beneficial use attainment without a higher and stable water level. Conventional TMDLs are simply not appropriate at this stage. When the lake water level is stabilized at an agreed upon a "desirable depth" of say, 20-25 ft (1240-1246 ft msl) the

water quality will probably improve so that the current TMDL targets will either be met naturally or can be established in a more meaningful context. The 1240-1246 ft. level is more consistent with the existing Agreement between the City of Lake Elsinore and EVMWD to control the lake level.

The long-term TMDL targets should be focused on reaching the desirable water level and maintaining as small as possible seasonal water elevation variations. Once this occurs, biomanipulation may occur with or without any help from TMDLs and lake clarity will improve, algae levels decline and the in-lake TMDL targets may be reached or exceeded. Without a stable water level, the TMDL targets will probably never be reached in a consistent fashion. The current numerical targets for Lake Elsinore do not provide any acceptable water clarity or protection from fish kills or malodor.

Variable lake level should trigger change of beneficial use designation in Basin Plan.

With the lake drying out historically, the beneficial use designations of WARM, REC1 and REC2 may be overstated because of their intermittent opportunity. This is not to say that the lake can't be used for fishing and water sports, but the circumstances for that use are usually less than optimal. For example, water clarity recently has been poor at less than 1 meter and game fish variety is small. The long term difficulties of sustaining adequate water levels without the use of recycled water is clearly demonstrated in figure 2-2. The problems of sustaining anything but nuisance fish is clear as described in the LESJWA proposed Fisheries Management Plan.

Summary of importance of stable water level.

With a stable sustained water level, the lake may be able to adapt to a lesser degree of eutrophication without the imposition of extremely conservative low water quality requirements. Without a stable water level, the lake will not improve. In the 2-½ year study of the effects of using recycled water to supplement the lake, it was observed that adding "distilled water" would not make a noticeable lake improvement because of the strength of the natural conditions. Without the recycled water from the pilot program, the current level of the lake would be 3.2 ft lower.

NUMERIC TARGETS: ALTERNATE SUGGESTIONS TO THE AMOUNTS AND DEFINITIONS USED IN THE TMDL

Dissolved oxygen.

The DO targets for the deeper water in Lake Elsinore and Canyon Lake (table 401 in the draft report) is satisfactory to achieve beneficial uses for two reasons.

- Research in Lake Elsinore has shown that high levels of DO (5-10 mg/L) are needed to fully suppress the release of soluble phosphate and ammonia (Beutel, 2000). This work confirms existing practices in proposed lake management.

- The most important beneficial use impairment in Lake Elsinore is lack of water. The final review of the Pilot program needs to be taken into account for using recycled water as a supplement to Lake Elsinore. The Draft final report admits that due to the changes in Lake Elsinore difficulties were created "trying to tease out the direct influence of recycled additions over the last two years". This source of water should not be precluded by restrictive discharge requirements until the impacts are fully understood. Nutrient removal to extremely low levels would be premature at best to further study the progress of other LESJWA projects to manage the Lake.

Recommendation 2. Numeric targets for nitrogen and phosphorus.

We understand that the RWQCB staff disagree, but reiterate our proposal for the record. The proposed targets in the TMDL for phosphorus are 0.1 mg/L and .05 mg/L both measured at total phosphorus (TP). The equivalent standards for nitrogen at 0.75 mg/L measured as total nitrogen (TN). The TP target is predicated on a supposed phosphorus limitation for algae growth in the lake and the TP standard is based on a 15:1 ratio of N:P.

The use of TN and not TIN to derive a P:N ratio inevitably biases the ratio to show phosphorus limitation. A more rational ratio of TIN: 80% TP should be used to determine if there is a relative shortage of P or N. Such a difference is not academic. The reduction of N or P from the watershed requires very different emphasis and technologies. Reduction of N, or P, in the lake may also require different methods. In addition, the reduction of N and P is best done in parallel with TIN and TP being kept at a constant 15:1 ratio. Use of TN to TP will obscure the balance in the desired ratio and provoke increased growths of possibly toxic blue-green algae cyanobacteria which could interfere with the proposed Biomanipulation Proposal.

New Consideration: Algal growth in Lake Elsinore is limited by light and CO_2, not nitrogen or phosphorus as stated in the TMDL.

Light limitation.

At present, it is unlikely that the lake is limited by any "conventional" nutrient such as nitrogen or phosphorus. TMDL targets based on N or P concentrations are one step away from reality. Light is probably the most limiting factor for most of the day and carbon dioxide limits growth in the afternoon when pH rises due to depletion of CO_2. The recent summer chlorophyll *a* concentration of > 300 mg/m^2 (>300 ug/L (2000-02, see TMDL appendices) exceeds the theoretical aerial maximum chlorophyll *a* value of 250 mg/m^2 even if the lake was only 3 ft deep. The high chlorophyll in the upper water uses up all the biologically usable light and thus the deeper algae are effectively in the dark and cannot photosynthesize. When the wind blows, surface algae are mixed down and deeper ones mixed up so, unlike flowers shaded by trees, they do not die. However, overall

growth, productivity, and potential oxygen demand in the sediments and in the water at night are still limited by available light, not nutrients.

With the current average depth of about 12 feet (3.5 m), there is far more algal pigment than can be efficiently used. The current value is approximately 1,000 mg/m^2 or four times the theoretical maximum. Even if the chlorophyll falls to levels found earlier at higher water levels (100-150 ug/L) the same high aerial value will occur since the lower pigment will be spread over a deeper water column. At these higher water levels (~ 25 ft, or 7.5 m) the lower chlorophyll per volume still integrates into over 900 mg/m^2, almost identical to the current aerial values at lower water levels. At some deeper depth the mixing of deeper water will be small (see Anderson's Appendix in the TMDL) and chlorophyll values will fall in deep water so that the integrated column number falls. However, the decline will still put the aerial value well above the maximum and thus light will still limit algae growth in Lake Elsinore over all contemplated water depths.

Carbon dioxide limitation.

At or even much below chlorophyll *a* levels of 100-300 ug/L (900 - 1,000 mg/m^2) the amount of dissolved carbon dioxide is not able to keep pace with maximum photosynthesis. Carbon dioxide will dissolve back into the lake each night so that the next morning algal growth can resume but this still means the daily production rate is limited by light and carbon dioxide.

Given the rate of internal loading of both N and P and current concentrations of the soluble bioavailable forms of these two elements, it is doubtful if the target concentrations can be reached, or if reached will attain the decline in algae required to meet beneficial uses. For most lakes, a minimum water transparency of 2 m (~ 6.5 ft) measured as Secchi disc depth is required to establish body contact as a beneficial use. At this water clarity, lifeguards and other swimmers could see the body of a drowning swimmer in much of the shoreline water. The current predictions of water transparency are in the range of 0.4 to 1 m (1.3 to 3.3 ft). The beneficial use improvement of water clarity increases of 1 to 3 ft are not an obvious beneficial value increase for a lake with many public beaches and good use potential.

Recommendation 3.

Based on the above discussion it is recommended that the current policy with no fixed standards for the lake, in terms of phosphorus and nitrogen, be continued. Tightening the dissolved oxygen standard (see below) will provide a better protection of beneficial uses than the indirect N or P standards. We understand the need to set numerical standards to meet The EPA guidelines and understand the implication of EPA_rejection or possible litigation, but setting numeric standards for the sake of the numbers is not in the best interest of the lake or the public that may benefit from the lake even in its unique eutrophic ephemeral state. The EPA guidelines must surely have some provision to manage water quality that is not the typical numerical standard requirements.

Increased dissolved oxygen standard.

A standard for DO throughout the water column seems to be all that is required to protect beneficial uses at present. The climate seems to make a mockery of attempts to control the lake nutrient values. However, an increase in imported water to maintain the lake at a much higher level, regardless of the water source or nutrient levels (within reason) seems the optimum way to improved lake beneficial uses. It is noted that the water quality model developed by Professor Anderson shows a continual improvement in water quality as the lake depth increases (see Appendix B of the TMDL).

It is likely that fish kills in Lake Elsinore are due to low DO, in particular short nocturnal episodes in calm conditions followed by mixing. The force for mixing could be either wind, or convection currents. Oxygen runs out in bottom waters when mixing of oxygen-rich water ceases or is slowed so that the demand for oxygen in the sediments exceeds the supply provided by vertical mixing. For almost any inflow of nutrients into this particular lake, there will be a high sediment oxygen demand (SOD). Warm water fish in Lake Elsinore can escape low bottom water DO by moving to the surface. However, when the lake turns over with little bottom DO, the entire water column can fall below 1.5 mg/L DO and large fish kills occur within minutes.

ADJUSTING THE DEFINITION OF N AND P TO REFLECT THEIR USE BY NUISANCE ALGAE

Recommendation 4. Nitrogen definition.

While staff has stated its disagreement with the definition of the best nitrogen criteria and deferred the nitrogen standard to the 2020 TMDL, it is critical that the true nitrogen requirements be studied as part of the RWQCB's commitment to make adjustments to the TMDL as part of the triennial Basin Plan reviews.

The use of TN is not appropriate for lake water quality targets or models and will blur any efforts to determine cause and effects. Total-N includes the two main bioavailable forms of nitrogen (nitrate and ammonia + total inorganic nitrogen or TIN), but, also, the biologically unavailable form of dissolved and particulate N. For algae control, it is the TIN that is important. The current approach uses TIN and its continuation is recommended. If TN is used instead of TIN, the target will be meaningless since it is quite possible that the standard could be met, but algae blooms would continue and vice versa. In Lake Elsinore the difference between TIN and TN is critical, since most of the TN is organic nitrogen and very little is bioavailable TIN (draft report, Chapter 4, Table 4-2). If TIN were used instead of TN it is probable that the lake would become strongly N-limited as is typical of eutrophic. For example, constructed wetlands in the watershed are an excellent and inexpensive way to reduce nitrate (e.g. Santa Ana River or San Diego Creek) while it is much more difficult to reduce phosphate or TP with such wetlands (e.g. Florida Everglades protection wetlands project). Conversely, it is

relatively easy to reduce TP loading with detention ponds in the watershed but hard to remove nitrate with such devices.

The use of TN for recycled water is problematic in normal treatment processes for nutrient removal. In a recent report on upgrading the EVMWD Regional TP (provided to Ms. Hope Smythe) for nitrogen and phosphorus removal it is pointed out that effluent TIN is expected to less than TN by 1.5-2.0 mg/l. Normal nutrient removal for nitrogen reaches 2-2.5 mg/l TIN. The long term TMDL of 0.75 mg/l TN will require external offsets which seems excessive when put in relation to the tremendous positive value of water supply for the Lake. The supplemental water WLA should be set based on the available treatment technology being proposed as part of the LESJWA projects.

Recommendation 5. Phosphorus definition.

While staff disagrees, we believe that further study is required to validate the best phosphorus standard, if needed. In contrast TP is a usable standard so long as the TP does not contain much unavailable P (usually apatite, calcium phosphate). The target should be amended to target biologically available TP. The internal loading from the sediments is always soluble and biologically available phosphate and is thus covered by the TP designation. However, external loading may be mostly apatite washed in from erosion of the surrounding hills and creek banks. Tests are needed over several storms to assess the percentage of inflowing TP that is biologically available.

Difficulty of setting TMDL targets in Lake Elsinore.

The levels of nutrients specified as target amounts are probably too low for realistic implementation in a lake with such a high ratio of lake surface to drainage area. Lake Elsinore has a ratio of 167 (3,000 to approximately 500,000 acres) and lakes with ratios over 1: 40 are generally eutrophic. Certainly, ratios in excess of 1:100 are almost certainly eutrophic. Note that the management of the lake that reduced that lake surface area by 50% also increased the likelihood of eutrophication.

The ratio of watershed to lake area can be combined with the depth of the lake (> 30 ft) to indicate morphometrical eutrophication. Lakes with water depth less than 30 ft are normally polymictic. That is, the water is mixed top-to-bottom every few days, or weeks, even in summer. The TMDL notes such a condition in Lake Elsinore and it is part of the model in Appendix 2. Given the large drainage basin, nutrients flow into the lake in large amounts. Also, with its shallow depth and polymixis, the nutrients grow algae in large amounts. Only by diverting the light or the nutrients into less nuisance forms, can the beneficial uses of Lake Elsinore be achieved. It is likely impossible to reduce the nutrients sufficiently in the watershed to achieve the beneficial uses set by the board. The beneficial uses are unnatural and can only be achieved by other means than classical TMDLs.

However, the existing beneficial uses can be achieved by other methods, primarily by lake management. Most importantly, good water clarity (> 2 m Secchi depth) is only achievable with biomanipulation that requires a relatively stable water level. The TMDL document will provide only ~ 0.5 to 1 m Secchi depth even if the TMDL targets are reached. A Secchi depth of 0.5 to 1 m should not be an acceptable value for public water contact recreation.

Recommendation 6. Fish kills not clearly related to water depth in partial contraction to the TMDL

We understand that staff believes this analysis does not warrant changing the TMDL recommendation but it emphasizes the value of a holistic approach to manage the Lake for increases in benefits instead of regulating without explicit cause and effect changes.

Fish kills are the second most important factor in the beneficial use impairment in Lake Elsinore after water level maintenance and prevention of the lake drying out. The TMDL correctly states that the fish kills are primarily due to low dissolved oxygen (DO) levels in the lake. However, the statement in the TMDL that "...it appears that fish kills coincide with either very shallow lake levels or high flows from the watershed due to heavy rainfall events" and the evidence provided in Table 3-1 does not fully reflect the most pertinent data and is open to alternative interpretations. One such alternative is presented below. In particular, it should be noted that although the draft EIR is correct in the above quote, it is only part of the story. It is also true that low lake levels that "caused" fish kills often did not result in large fish kills even in adjacent years. Other factors seem to play an important role and such factors include nocturnal convection. The distinction is important since different cures are needed for low water, nocturnal convection or other possible causes of the fish kills in the lake.

Data for the most recent years 1991-98 when the lake was in its current much reduced form but still with a full range of water depth is shown in Table 1. This table shows no good relationship between water levels and fish kills in Lake Elsinore. Data for earlier years (Appendix Table A-1) supports this finding in general. Fish kills occurred at high, low, and intermediate water levels. Large fish kills did occur at very low water levels in the1986-92 drought but similar low lake levels, often in adjacent years, did not result in large fish kills. High lake levels resulting from recent high inflows were also not reliable predictors of fish deaths, in contradiction of the statements in the TMDL. Between 1982 and 2002, in water less than 17 ft, major fish kills occurred only 20% of the time. In water greater than this depth (18-33 ft) major fish kills occurred 14% of the time. If the very shallow waters of the 1987-92 droughts are excluded, fish kills of some kind occurred in 38% of years, all of these being in water over 17 ft deep. Thus, the evidence tends to suggest that shallow water is not a critical item in fish kills in the lake. Of course, if the water became very shallow, a few feet, the fish may run out of food or be crowded into such a small area that fish kills would occur. However, this has not been the case for the past few decades.

Table 1. Lake Elsinore: Surface elevation, water depth, dissolved oxygen and reported fish kills 1991-98.

Year	Max. depth (ft)	Fish kill estimate	Lake level
1991	8	Large	Very low
1992	7	Small	Very low
1993	33	Large	Very high
1995	32	Small	Very high
1996	27	Small	Desirable*
1997	23	Small	Desirable
1998	29	Medium	High

* Desirable is an agreed range of water depths.

Overall, the lake levels in Lake Elsinore, California do not seem to have had a predictable effect on fish kills. Even at very low water levels (< ~1233 feet or maximum depth < 10 feet), large fish kills occurred only 2 out of the 4 recent years of record. Since the early years of the 1989-92 droughts did not produce large fish kills, the deaths cannot be due to the simple squeezing together of large numbers of fish as the lake diminished in volume. Therefore, another mechanism must operate along with the low water levels in order to result in large fish kills (see Table 2). In this table lake volume is used as an alternative to lake level and the amount of algae present (surrogate for simple oxygen depletion or excess eutrophication) is shown. It can be seen that fish kills were primarily due to some other factor than lake volume (lake level) or algae blooms (oxygen demand). There is not a clear relationship between algae blooms and fish kills. The lack of relationship is critical since the TMDL which attempts to control algae blooms via nutrient reductions. The evidence presented here is that such a control will be erratic and tentative and perhaps fish kills could more efficiently be reduced by other methods than TMDL implementation. And, there may be other reasons for the TMDL than fish kill reductions.

Table 2. Some statistics on oxygen conditions, oxygen demand and volume as related to fish kills for Lake Elsinore in the period 1990-96. Data from Montgomery-Watson (1997).

Date	Initial DO mg/L	Final DO mg/L	Duration of low DO days	Oxygen demand mg/L/d	Approx. lake volume (10^6 m^3)	Mass based oxygen demand tons/day	Fish kill
July-Aug 90	6	0	60	0.10	35	3.4	X
March 91	7	0	30	0.23	35	8.1	
July-Aug 91	9	0	100	0.09	35	3.2	
Feb 1992	14	9	30	0.17	100	17	
March 92	9	6	30	0.10	100	10	
July-Aug 92	6.5	2	60	0.08	100	8	X
Mar-April 92	16	8	45	0.18	100	18	
Jun-Aug 94	8.5	2.5	90	0.07	100	17	
May 95	14.5	6	30	0.28	110	31	
June-July 95	9	3	90	0.07	110	7.3	X
June 96	10	5.5	30	0.15	92	14	

Thank you for the opportunity to review your proposed TMDL.

Sincerely,

Ronald E. Young, P.E., DE
General Manager
Elsinore Valley Municipal Water District

REY/ja

Enclosure
cc: Art Littleworth, Best, Best & Krieger

APPENDIX A. LAKE ELSINORE: FISH KILLS AND WATER DEPTH

Table A-1. Lake Elsinore: Surface elevation, water depth, dissolved oxygen and reported fish kills for 1982-2000. Equal attention to fish kills was probably not given to all years, especially higher water years 1982-87. However, the medium and large kills noted in the period 1991-98 would probably have reported. Data from Montgomery-Watson, 1997, Santa Ana Regional Water Quality Control Board, 2000, Riverside County Flood Control & Water Conservation District, 2001

Year	August Lake elevation ft	Max depth ft	Max depth m	DO < 1 mg/L at bottom	Fish kill M-W	Fish Kill RWQCB	Gen lake level	Mean depth, ft
1982	1251	28				No report	High	
1983	1260	37				No report	Very high	
1984	1252	29				No report	High	
1985	1248	25				No report	Desirable	
1986	1245	22				No report	Desirable	
1987	1241	18				No report	Desirable	
1988	1237	14				No report	Low	
1989	1233	10				No report	Low	
1990	1231	8		July-Aug	July-Aug	No report	Very low	
1991	1231	8		Mar-Ap, Oct	No	Large	Very low	
1992	1230	7		Aug	July-Aug	Small	Very low	
1993	1256	33		Aug?*	No	Large	Very high	
1994	1252	29		Sept	No	No report	High	
1995	1255	32		Aug	June-July	Small	Very high	25
1996	1250	27				Small	Desirable	
1997	1246	23				Small	Desirable	
1998	1252	29				Medium	High	
1999	1247	24				No report	Desirable	
2000	1243	20				No report	Desirable	
2001	1239	17				-	Desirable	

* No data reported for mid-summer, but DO 2 mg/L in July as in previous years when DO < 1 mg/L in August.

WARREN D. WILLIAMS
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

October 13, 2004

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality
Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Dear Mr. Thibeault:

Re: Comments on Draft Lake Elsinore and Canyon Lake Nutrient TMDL and Basin Plan Amendment

The Riverside County Flood Control and Water Conservation District (District) is the Principal Permittee on the Riverside County municipal separate storm sewer system (MS4) permit. The District is submitting the following comments on the Draft Lake Elsinore and Canyon Lake Nutrient TMDLs and Basin Plan Amendment (BPA) released September 3, 2004.

Adaptive Management

During the June workshop, several issues were raised by the District and other stakeholders regarding the feasibility of the TMDL. As you noted at the close of that workshop, the Regional Board is effectively being required to implement legal requirements without practical solutions. In recognition of this, however, Regional Board staff has made efforts to provide flexibility to the TMDL by incorporating adaptive management concepts. The adaptive management concepts are premised on allowing the science upon which the TMDL is based to continue to develop, then allowing for review and modification of the TMDL based on the improved science at specified future dates.

Adaptive management requires the ongoing participation and coordination of all stakeholders, including Regional Board staff. It also requires that the TMDL incorporate language identifying likely and potential deficiencies with the TMDL so that:

- Future Regional Board members reviewing revisions of the TMDL clearly understand that the existing TMDL was adopted with reservation;
- Stakeholders can justify expenditures of funds to support development of the science in those areas where the TMDL is understood to be deficient;
- Regional Board staff can continue to justify expenditure of staff time and resources to support the stakeholders efforts to revise and improve the TMDL, including justification of expenditures for future Basin Plan amendments; and

- The stakeholders are allowed to apply for grants to further develop the science and technology necessary to address TMDL deficiencies, including lack of technology to address the problem.

Without this clear and transparent understanding of the known and potential deficiencies, it is likely that the adaptive management concepts will fail as those most familiar with the TMDL problems move on and current informal agreements and understanding are lost or forgotten. Recent reviews of Basin Plans for other Regional Board regions, including the Los Angeles Region, clearly indicate this potential for failure. These reviews of the administrative record for the aforementioned Basin Plans identify Basin Plan Amendments where Regional Board staff adopted inappropriate or tentative Water Quality Objectives for various waterbodies. The Water Quality Objectives were adopted to meet deadlines with the intention of reviewing them at a future date when more resources and time were available. In many cases, those staff members involved with the Basin Plan moved on and the intentions were forgotten, leading to presumptions by subsequent Board Members and staff that these Water Quality Objectives were appropriate and properly vetted prior to adoption. To avoid the mistakes made in other regions, it is important that the TMDL Basin Plan Amendment and Technical Support document clearly and transparently identify deficiencies.

To date, Board staff has made outstanding efforts to work with stakeholders to develop the TMDL, to incorporate adaptive management concepts, and to address stakeholder concerns. It is for this reason, that despite the District's position that the TMDL is both economically and technologically unachievable, we are willing to look past these deficiencies and participate in a cooperative effort with other responsible parties. However, the District believes that the following concepts and data need to be incorporated into the TMDL to ensure that known and potential deficiencies are clearly understood by present and future stakeholders.

Scientific Limitations

The District requests that the following discussion be appended to the end of the Introduction of the Technical Report:

In summary, the science supporting the interim and final TMDL numeric targets for total phosphorous and final TMDL numeric target for total nitrogen (numeric targets) proposed in the BPA is preliminary. Where science was lacking, Staff selected numeric target values conservatively for nutrients. The ability of the TMDL to achieve these standards has been called into question by the Regional Board's own peer reviewer, Dr. Josselyn:

> "The proposed targets rely heavily on controls for internal nutrient cycling for Lake Elsinore which may not be achievable for practical and methodological reasons. The [Regional Board] staff needs to demonstrate that such technologies as suggested could actually work in this system."

Although Dr. Josselyn indicated an alternative approach would be to require additional nutrient reductions in the upper watershed, several stakeholders, including the Riverside County Flood Control and Water Conservation District, have provided evidence that currently available technologies are not capable of addressing the proposed interim and final numeric targets for nutrients.

There is some concern that Lake Elsinore cannot naturally support the beneficial uses assigned to it. As stated by Dr. Josselyn:

> "I concur with the statements that the Lake is naturally eutrophic given the observations of fish kills previously and the terminal nature of the Lake in this watershed...The targets for phosphorus as proposed reflect both the 'natural' eutrophic nature of Lake Elsinore, the reality of the high levels of phosphorus regeneration from the sediments, and the practicalities of trying to 'treat' sediments in-situ. The shallow nature of the lake leads to wind resuspension [a major source of phosphorus regeneration] that cannot be controlled."

It is clear that further analysis and review of the TMDL is necessary. If the additional science and analysis does not indicate that more assimilative capacity is available in the lakes, then a review of the Basin Plan Beneficial Uses may be in order to determine whether the existing designated beneficial uses for the lakes can be supported by natural conditions. The State Water Resources Control Board has issued draft guidance that indicates that standards should be revised based on attainability:

> "If the failure to attain standards is due to the fact that the applicable standards are not appropriate to natural conditions, an appropriate regulatory response is to correct the standards" (December 2003 State Board Draft Water Quality Control Policy for Addressing Impaired Waters)

It is Staff's expectation that the phased analysis proposed by this TMDL will lead to the identification of additional assimilative capacity in the lakes and upper watershed.

Legality

The legal basis for the TMDL requirements is not clear. Although the District does not contend the right of the Regional Board to adopt a TMDL to regulate discharges to impaired receiving waters, the regulatory authority to require "retroactive clean up" of the sediments or nutrients in the lakes does not appear to exist in either the Clean Water Act or Porter-Cologne. The District requests that the authority to regulate the removal of sediments from the lakes by the upstream stakeholders be cited in the TMDL basin plan amendment. Without this authority, the Regional Board must assign Tasks 8 and 9 to place responsibility solely on the entities who own the lakes.

Staff's contention that the proposed numeric targets are only interpretations of existing water quality standards and not Water Quality Objectives does not comport with California Water

Code. Upon adoption, the numeric targets would carry the weight of water quality objectives. The District supports EMWD's June 3 verbal comments regarding this issue.

The recent Superior Court ruling in City of Arcadia *et al* versus The SWRCB and Los Angeles Region RWQCB (December 24, 2003), states that any amendment of a Basin Plan, independent of whether it adopts water quality objectives is subject to Section 13241 of the California Water Code. Despite the appeal of this decision, the District holds that the Superior Court ruling was consistent with the intent of the law.

Are Permittees required to meet the same concentrations as specified in the Lakes?

Current nutrient BMP technologies, particularly those referenced in the September 17th Regional Board staff report are not capable of economically or technologically addressing the volume of water generated during a wet year. These BMPs are generally sized to treat flows from the average annual storm event and would short-circuit during wet year events. However, wet years are the only years that the upper watershed stakeholders contribute significant nutrient loads to Canyon Lake and Lake Elsinore. If the wet years cannot be treated, compliance with the interim phosphorus target for the TMDL is mathematically impossible for discharges to Canyon Lake. The following table clarifies this:

Allowable and Existing TP Discharges for Upper Watershed Stakeholders (Urban, CAFO, Agriculture, Open/Forest, Septic) to Canyon Lake

1. Allowable Annual TP Load for Upper Watershed	3,844 kg/yr
2. Cumulative 10 yr. Allowable TP Load	38,444 kg
3. Estimated Existing TP Load for Wet Year	43,031 kg/yr
4. Estimated Cumulative Existing TP Load for 1.6 Wet Years	68,849 kg
5. Mandatory Minimum TP Load Reduction for Wet Year (Row 4 – Row 2)	30,405 kg
6. Mandatory Minimum TP Load Reduction to Allow 1674 kg/yr [existing dry year TP discharge) TP discharge during 8 non-wet years (Row 4 – (1674*8)]	43,797 kg
7. Allowable Wet Year TP Load based on Row 6 (Row 4 – Row 6)/1.6 wet years	15,657 kg/yr
8. Estimated volume of flow during a typical wet year	139,345 ac ft
9. Mandatory Minimum Concentration for Influent to Canyon Lake From Upper Watershed	0.09 mg/l
10. Interim Target for TP Concentrations at Canyon Lake	0.10 mg/l

It is clear from the table that a single untreated wet year would exceed the entire 10-year allowable TP load for the upper watershed stakeholders. As stated before, this event is economically and technologically impossible to treat. Further, this statistic is particularly disconcerting considering that 1.6 wet years, or enough TP to generate nearly twice the allowable TP load to Canyon Lake are expected in a given 10-year compliance period. In order to allow a TP load of 1674 kg/yr into Canyon Lake during non-wet years, the wet year events MUST be reduced by approximately 63% to an allowable TP load of 15,657 kg into Canyon Lake. Based

on a the wet year storm volume of 139,345 ac ft, a concentration of 0.09 mg/l, or slightly less than the interim 0.1 mg/l concentration required in-lake must be achieved. Again, as stated in our June 3rd letter, this is neither technologically nor economically feasible for dry or moderate years, much less during the extreme storm volume of a wet year.

In addition, as stated in our June 3rd letter and as supported by Dr. Josselyn's peer review of the TMDL, the ability of the available in-lake treatment technologies to meet the 30% and 70% load reductions is suspect at best. As noted by Dr. Josselyn, "the reduction levels for phosphorus sought for Lake Elsinore rely significantly on proposals that have not been tested for their effectiveness in this particular situation". Although Dr. Josselyn notes that alum may be an alternative treatment mechanism, current chemical conditions in Lake Elsinore are not ideal for alum addition; flocculation and sedimentation processes require lower pH levels than currently exist in Lake Elsinore in order to achieve successful phosphate removal.

Cost Estimates

Based on the EPA's Urban Nutrient Reduction BMP Costs (1999) referenced in the Regional Board Staff Report, the following table estimates the costs associated with the construction of nutrient reduction BMPs in the San Jacinto River Watershed to address the wet year flow volume (139,345 ac ft or approximately 6 billion cubic feet). The cost estimates below presume each stakeholder in the watershed tributary to Canyon Lake would implement the specified BMP. Urban Stakeholder BMP costs, based on a rough estimation of land use (both urban areas and non-urban areas tributary to urban systems) and runoff rates, could represent between 50-60% of the total cost identified below:

BMP Construction Costs to Treat Wet Year Flow

BMP	EPA, 2003 $s (per ft^3 treated)	Cost, 2003 $s ($V_{wet}$ = 6 Billion ft^3)
Constructed Wetland	$0.60 - $1.13	$ 3.6 B – $ 6.78 B
Infiltration Trench	$4.00	$ 24 B
Infiltration Basin	$1.18	$ 7.08 B
Sand Filter	$2.72 - $5.96	$ 16.3 B – $ 35.7 B
Bioretention	$4.79	$ 28.7 B
Retention & Detention Basin	$0.45 - $0.90	$ 2.7 B – $ 5.4 B
Grass Swale	$0.45	$ 2.7 B
Filter Strip	$0.00 - $1.18	$0 – $ 7.1 B

In addition, costs are provided for BMPs to treat moderate year events:

BMP Construction Costs to Treat Moderate Year Flow

BMP	EPA, 2003 $s (per ft^3 treated)	Cost, 2003 $s ($V_{mod}$ = 253 M ft^3)
Constructed Wetland	$0.60 - $1.13	$ 152 M – $ 286 M
Infiltration Trench	$4.00	$ 1,000 M
Infiltration Basin	$1.18	$ 299 M
Sand Filter	$2.72 - $5.96	$ 688 M – $ 1,500 M
Bioretention	$4.79	$ 1,200 M
Retention & Detention Basin	$0.45 - $0.90	$ 114 M – $ 228 M
Grass Swale	$0.45	$ 114 M
Filter Strip	$0.00 - $1.18	$0 – $ 299 M

The above table does not include land acquisition, design, geotechnical testing, legal fees, and other unexpected or additional costs such as maintenance and operation of each BMP. It should be noted that in the arid climate of the San Jacinto River Watershed, BMPs such as constructed wetlands, grass swales and filter strips would require a reliable year-round supply of water, aside from storm and urban runoff, in order to operate. It is clear from the above referenced tables that it is neither economically nor technologically feasible to treat either the wet and/or moderate year flows. In addition, none of the BMPs referenced above are guaranteed to meet the 0.09 mg/l phosphorus concentration required of wet year discharges to comply with TMDL interim targets. The District would also note that the costs for constructed wetlands identified above are commensurate with our June 3rd cost estimates for wetlands.

Newport Bay TMDL

Several references have been made at the stakeholder and Regional Board workshops regarding the success of the Newport Bay Nutrients TMDL. Although Orange County (OC) has had great success with achieving nutrient TMDL targets in Newport Bay, the OC-Permittees have noted that nitrogen concentrations in their upper watershed can exceed 10 mg/l TN and that they have been able to reduce nitrogen concentrations to 2 mg/l. The OC-Permittees estimate expenditures of approximately $5 million per year in capital and operational costs in order to achieve the nutrient targets. Stormwater discharges in the San Jacinto Watershed average 2-5 mg/l TN and stakeholders in this watershed will be required to reduce nitrogen concentrations to 0.75 mg/l. The TMDL programs are not numerically comparable – the proposed runoff concentrations to be achieved in the San Jacinto Watershed are significantly lower and economically unachievable under the best available BMP technologies. Further, treatment efficiency for available nutrient treatment BMPs diminishes as the effluent concentration is reduced and as the influent concentration approaches the required effluent concentration. The costs neither balance nor justify the anticipated benefits.

Additional Proposed Recommendations

The District believes that the following recommendations would reasonably address the current deficiencies in the TMDLs:

1. Set narrative targets for nutrients since the TMDL is predicated on numeric targets that are intended to be more flexible than Water Quality Objectives. Another alternative is to consider the adoption of narrative targets for TP and TN. The narrative nutrient targets could require that discharges from the upper watershed not lead to exceedances of numeric dissolved oxygen concentration targets established for the Lakes; this would provide the stakeholders with additional flexibility to address the algal problems in the Lakes and would ensure that they are not penalized for non-compliance with an arbitrary numeric target;

2. The Regional Board should facilitate the stakeholder organizational effort by clearly identifying all responsible parties, including agricultural entities in either the Technical Report or the Basin Plan.

3. The Regional Board should also clearly identify in the Basin Plan the regulatory tools, such as NOV's, written requests or other actions that can be utilized to assist the stakeholders in gaining the support of the various responsible parties. The list should also identify how these tools may be used to ensure cooperation in and compliance with this proposed TMDL. For instance, how will regulatory tools be applied to assure all responsible parties financially support the joint monitoring requirements and the formulation and implementation of the Lake Sediment Nutrient Treatment requirements?

4. The Regional Board provide a launching point for TMDL implementation by recommending a fair and rational basis for allocating financial responsibility among all parties.

5. The compliance schedule for joint tasks should be extended by at least one year to accommodate the formation of a stakeholder organization, allow time for stakeholders to secure funding, and provide time for necessary consultants to be selected and contracted with.

6. If further analysis indicates that the lakes are naturally eutrophic, and thus the applicable standards are not appropriate to the natural conditions, the Regional Board should support a Use Attainability Analysis, or other appropriate mechanism, per the Water Quality Control Policy for Addressing Impaired Waters, to revise designated Beneficial Uses for the lakes.

Summary

It is critical that the adaptive management process succeeds, especially upon careful consideration of the cumulative cost of the current and future TMDLs affecting stakeholders in the San Jacinto Watershed. Failure of the adaptive management program for this TMDL may require watershed stakeholders to unnecessarily expend billions of dollars toward a solution-less problem. Funds unnecessarily spent on this TMDL will also subtract from the stakeholders' abilities to respond to future TMDLs that could provide measurable benefits to receiving waters. The District believes that the aforementioned recommended changes are necessary to ensure that this adaptive management process succeeds.

If you have any questions, please contact Stephen Stump at 951.955.8411 of our Regulatory Division.

Very truly yours,

Michael D. Rawson

for WARREN D. WILLIAMS
General Manager-Chief Engineer

JEU:ABC:cw
PC/90371

To: Hope Smythe, Chief of Inland Waters Planning Section
California Regional Water Quality Control Board, Santa Ana Region

From Robert Gearheart, Ph.D., P.E., Professor of Environmental Engineering
Humboldt State University, Arcata, California

Date: October 10, 2004

Subject: Review of Draft TMDL for Nutrients in Lake Elsinsore and Canyon Lake

The purpose of the letter report is to provide the Regional Board a peer reviewed assessment of the draft TMDL for nutrients in Lake Elsinore and Canyon Lake in Riverside County California. Activities included in the review are: 1) review of TMDL requirements and procedures, 2) review of documents provided by Dr. Cindy Li, and 3) preparation of a report. I must apologize for the delay in the preparation of the report but my summer was filled with field research activities and volunteer work in El Salvador with Engineers without Borders.

Lake Elsinore and Canyon Lake Nutrient Sources Assessment, Tetra Tech

I. Introduction and Objective

There is no demographic descriptions of the watershed and associated water use, present-future.

Was it an objective of this report to allow for WLA to be developed for future land use activities? I don't believe I found any prediction, other than general comments about future land use designation. No mention of the fact that sections of this water shed is one of the fastest urbanized county in the state, for example, with some 10 and 20 years prediction of potential WLA from these changing land uses.

I. Watershed Background

I am not totally familiar with the area in terms of point source loads from WWTP are there significant loads and /or flows? It would seem that reclaimed wastewater (if treated to a high level) would be the most reliable source of water for use in lake restoration.

Confusing to me the role of Mystic Lake and Perris reservoir play in the TMDL process. Neither mentions in this section but referred to in section IV.
It may assist readers not familiar with the system (this reviewer for example) to have a flow diagram of the hydrological connection of the streams, lakes, drainages, etc.

I. Nutrient Source Overview

What is the basis for identifying failing septic tanks, unimpeded access of cattle to stream and unsolicited discharges as not being factors to consider in this report (or did I misinterpret this statement).

Groundwater sources, cattle contaminated groundwater, and resultant surface water interaction?

Fertilizer addition-no mention of groundwater contamination -interaction-surface water? Is there a potential significant load with urban horticultural N and P addition?

Were any attempts made to quantify ammonia volatilization from dairies, an atmospheric source?

Septic tank phosphorus emission calculations-no attenuation of P through the soil column?

IV Technical Approach

How is the water used that has been excessively pumped from groundwater?
What are the nutrient levels in the groundwater?

Hydrology-wastewater reclamation-groundwater recharge?

Water balance for the system-specifically the role of ET on Lake Volume-

Pollutant representation-Is it not possible or not useful in the eyes of the modelers to have TSS a primary pollutant to consider in the model. It is mentioned, sediment, in the following sentence as a pollutant to consider for future efforts.
It seems that the fate of phosphorus specifically could be tracked with sediment.

The nature of the soils (ACS Soil C and D) in and around the reservoirs, would suggest relatively high P adsorption values.

Internal loads from reservoir are these sinks a significant factor in modeling In-lake chlorophyll production levels.

Model calibration and verification

Graphic analysis of calibration analysis, Fig. 4-22 through 4-25
The model effort appears to do better for the less extreme flows-what is lost by not have the same confidence for the high flow conditions?

Consistent under prediction of TN and TP not fully explained or accounted for in a sensitivity analysis.

5.0 Model Results

Figures 5-7 through 5-10 discussion- have antecedent conditions been considered in the three water year and relative land use assumptions. Limited discussion about these predictions. I would assume this is what the TMDL is all about in terms of source loading. Reoccurrence intervals for these types of water years could be used to develop a loading probability distribution relationship. Not sure what was modified from this report, if any in the draft TMDL amendment.

Internal Loading and Nutrient Cycling in Canyon Lake/lake Elsinore-Anderson, et. al.

Both of these documents focused on the lake/s nutrient dynamics with the purpose of the determining the effect of WLA's to the total nutrient budget of the system. I did not have sufficient time to review in any detail the assumptions made in the analysis. It does appear, though, that good science was practiced in terms of sampling protocols (spatial representation and replication), statistical implication, and key nutrient fate and transport processes.

I followed the approach taken by Anderson, ET. Al. and support the conclusions drawn from the analysis. Again I did not have time to determine exactly what portion of his findings were modified in the draft TMD. The potential negative impact (P release from sediments) from the destratification of the shallow region of Canyon Lake is highly plausible and should be carefully evaluated.

The effect of Ca precipitation on P removal is suggested but not supported by water quality data showing dissolved Ca, Mg, and Fe concentrations. Conclusions reached by Anderson's model in terms of P loading is significant in terms of the reality of reversing the eutrophic process.

The observed reduction of P levels in the lake over the period of the data set is an interesting observation and not fully explained in the report.

Proposed Basin Plan Amendment

The discussion on page 32, and the associated Figure 5-2, suggest that P is not buried in the sediment (as in a long term remov al process). Discussion concerning phosphorus in the core samples seemed to deal more with the pore water not the fixed P. Perhaps there was information in the study but I did not find it. Given the type of sediment found in the lake I would guess that some P is driven to an ultimate sink. Even when all of the sediment is detrital material some of the P is buried, example Klamath Lake Oregon. I am not sure it would change the conclusion if it was a factor, but it appears to be missing in the conceptual modeling of the system.

While it appears to me, given the watershed condition, the climate, the land use activities, and the historic limnological conditions in the lake that there would a strong possibility that the requisite P and N loadings to reduce eutrophic conditions in the lake would not be possible. This is an example where the TMDL has no real application in terms of a likely outcome that removes the impaired water body status. Based upon the increasing pressure of development in eastern Riverside County and the internal load in the lakes the system it is probably non-reversible (Anderson 2002 and 2003).

The watershed loading and lake modeling efforts are well done and are representative of models that are commonly applied to conjunctive watershed/lake systems. The verification of the models suffer, as to many models, from lack of data. This is a particular problem with extreme water balance conditions, such as no out flows. I attempted to cross reference assumptions and finding between the Tetra Tech report, the Anderson reports and the draft TMDL amendment but was not able to complete due to time constraints.

I personally would have been interested in knowing more about the ecology of the lakes in terms of algal species, zooplankton species, fish species etc. There was mention of N fixation but little discussion of its temporal and/or spatial implication Considering the fact that the nutrient balances were on an annual basis these factors might not be significant , but might be interesting in terms of seasonal fluctuations.

The study's support the conclusions that the eutrophic condition of the lakes wtll remain in an impaired status due to the internal load of P. The nitrogen limiting condition is not fully documented but strongly suggest based on the annual loadings analysis performs in the studies. The recommendation of setting a target of 0. 1 mg/l of P is justified based upon the loading studies but not necessarily ecological supportable in terms of eutrophication processes. . Phosphorus levels of 0.08 to 0.010 mg/l are commonly cited as the limiting level for eutrophication.

While there is no real discussion and or feasibility analysis of BPM's and restoration alternatives in these studies there are some options that should be considered. One option would be extract the internal load and external load by processing through wetlands. Since TDS apparently are not a real issue the P fixed in wetland plants could afford marginal habitat improvement if the water loss could be lived with. This concept would be find portion of th lakes to restore to habitat value and recreational uses .

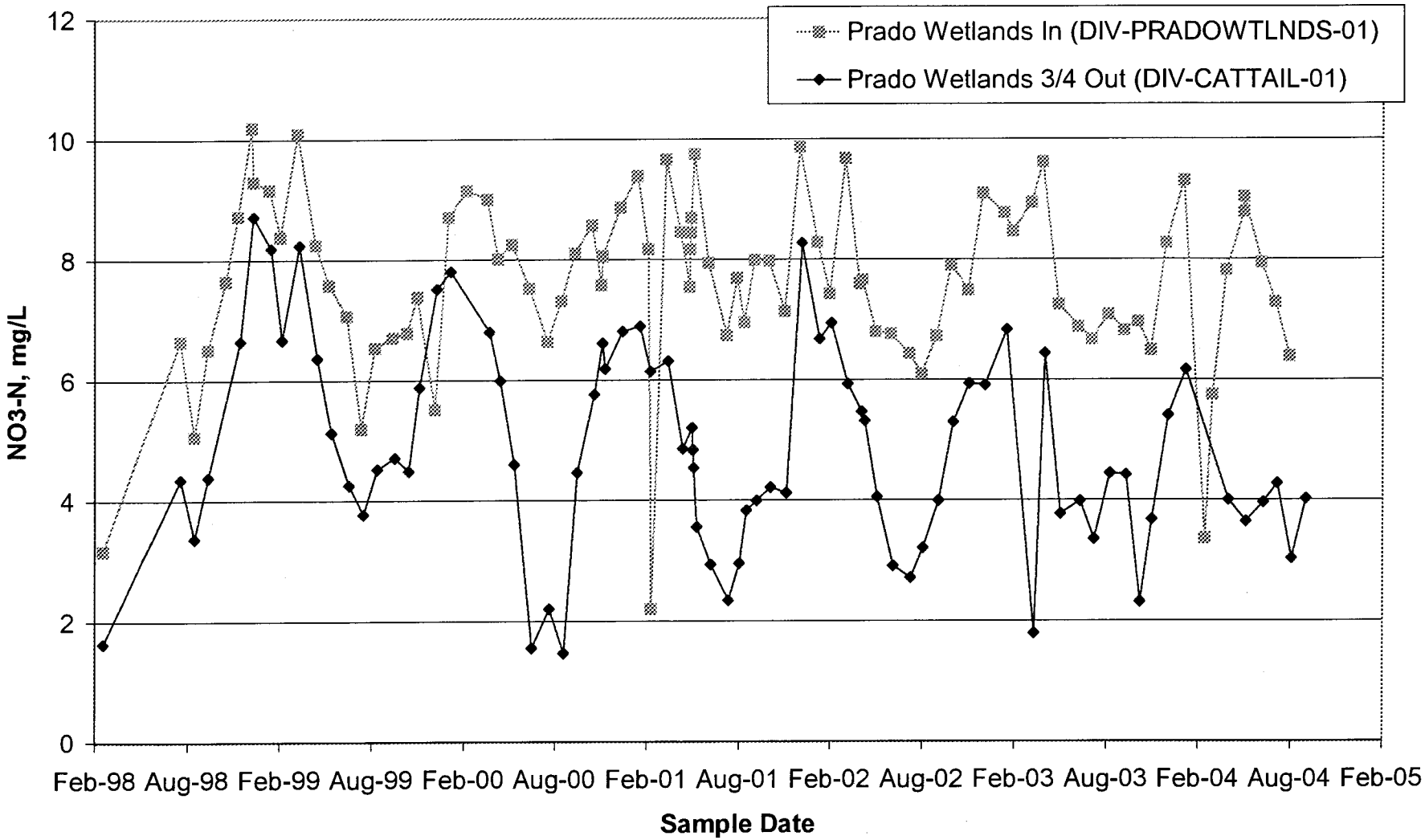
The other types of things being looked at are the effect of certain humic compounds on the phyto-plankton populations. I am assuming blue-green algae are present since there is mention of N fixation. An example of an in-lake treatment for eutrophic bodies of water is based on the use of humic compounds released from the aqueous decomposition of various plant material. There is considerable literature and operational research activities dealing with barley straw humics in Scotland. There is some evidence that the humics (brown water) from tule wetland perform in a similar manner. Historic references, for example, by Native

Americans around Klamath Lake suggest that brown water conditions from leached humic materials reduce blue-green algal populations in the late summer months.

I think there should be some mention of the drought conditions that appear to more of a long term cycle or possible new status quo condition in the draft TMDL. Given the drought conditions and potential global warming factors some mention should be made on the impact of reclaimed wastewater in the system within the context of the draft TMDL. Perhaps some mention of how reclaimed wastewater can be used to modify the impaired water bodies. When suggesting an interim P level of 1.0 mg/l one is within the economic r ange of nutrient removal processes in the water reclamation systems.

From this reviewers' observation the methods and data sets used in these reports are representative of accepted scientific and engineering procedures and protocols. The report supports the conclusions and recommendations with the exception of the role of P fixation in the sediment via precipitation/adsorption processes. The only caveat is that there is no analysis of BM'P's to meet these loads in terms of effectiveness, reliability, level of participation, and spatial and temporal application. I would tend to be very pessimistic in terms of being able to reverse the impaired nature of these water bodies in both the interim (2015) and final (2020) time frame.

Nitrate as Nitrogen Concentrations at Prado Wetlands



Parameter	Sample Date	Unit	RDL	Prado Wetlands 3/4 Out (DIV-CATTAIL-01)	Prado Wetlands In (DIV-PRADOWTLNDS-01)
NO3-N	16-Jan-03	mg/L	0.1		8.78
NO3-N	21-Jan-03	mg/L	0.1	6.83	
NO3-N	03-Feb-03	mg/L	0.1		8.47
NO3-N	13-Mar-03	mg/L	0.1		8.95
NO3-N	17-Mar-03	mg/L	0.1	1.79	
NO3-N	03-Apr-03	mg/L	0.1		9.62
NO3-N	07-Apr-03	mg/L	0.1	6.44	
NO3-N	05-May-03	mg/L	0.1		7.25
NO3-N	08-May-03	mg/L	0.1	3.77	
NO3-N	12-Jun-03	mg/L	0.1		6.88
NO3-N	16-Jun-03	mg/L	0.1	3.98	
NO3-N	10-Jul-03	mg/L	0.1		6.67
NO3-N	14-Jul-03	mg/L	0.1	3.35	
NO3-N	11-Aug-03	mg/L	0.1		7.09
NO3-N	14-Aug-03	mg/L	0.1	4.44	
NO3-N	11-Sep-03	mg/L	0.1		6.82
NO3-N	15-Sep-03	mg/L	0.1	4.42	
NO3-N	09-Oct-03	mg/L	0.1		6.97
NO3-N	13-Oct-03	mg/L	0.1	2.31	
NO3-N	03-Nov-03	mg/L	0.1		6.49
NO3-N	06-Nov-03	mg/L	0.1	3.68	
NO3-N	04-Dec-03	mg/L	0.1		
NO3-N	08-Dec-03	mg/L	0.1	5.41	
			AVERAGE	**4.22**	**7.64**
			% REMOVAL		**55%**

Parameter	Sample Date	Unit	RDL	Prado Wetlands 3/4 Out (DIV-CATTAIL-01)	Prado Wetlands In (DIV-PRADOW TLNDS-01)
NO3-N	15-Jan-99	mg/L	0.1		9.17
NO3-N	18-Jan-99	mg/L	0.1	8.19	
NO3-N	05-Feb-99	mg/L	0.1		8.38
NO3-N	08-Feb-99	mg/L	0.1	6.67	
NO3-N	12-Mar-99	mg/L	0.1		10.1
NO3-N	15-Mar-99	mg/L	0.1	8.24	
NO3-N	16-Apr-99	mg/L	0.1		8.26
NO3-N	19-Apr-99	mg/L	0.1	6.36	
NO3-N	13-May-99	mg/L	0.1		7.58
NO3-N	17-May-99	mg/L	0.1	5.13	
NO3-N	17-Jun-99	mg/L	0.1		7.07
NO3-N	21-Jun-99	mg/L	0.1	4.26	
NO3-N	15-Jul-99	mg/L	0.1		5.19
NO3-N	19-Jul-99	mg/L	0.1	3.77	
NO3-N	12-Aug-99	mg/L	0.1		6.54
NO3-N	16-Aug-99	mg/L	0.1	4.52	
NO3-N	16-Sep-99	mg/L	0.1		6.71
NO3-N	20-Sep-99	mg/L	0.1	4.71	
NO3-N	14-Oct-99	mg/L	0.1		6.79
NO3-N	18-Oct-99	mg/L	0.1	4.49	
NO3-N	04-Nov-99	mg/L	0.1		7.39
NO3-N	08-Nov-99	mg/L	0.1	5.88	
NO3-N	09-Dec-99	mg/L	0.1		5.52
NO3-N	13-Dec-99	mg/L	0.1	7.51	
NO3-N	06-Jan-00	mg/L	0.1		8.71
NO3-N	10-Jan-00	mg/L	0.1	7.8	
NO3-N	10-Feb-00	mg/L	0.1		9.15
NO3-N	23-Mar-00	mg/L	0.1		9.01
NO3-N	27-Mar-00	mg/L	0.1	6.8	
NO3-N	13-Apr-00	mg/L	0.1		8.02
NO3-N	17-Apr-00	mg/L	0.1	5.99	
NO3-N	11-May-00	mg/L	0.1		8.26
NO3-N	15-May-00	mg/L	0.1	4.6	
NO3-N	15-Jun-00	mg/L	0.1		7.52
NO3-N	19-Jun-00	mg/L	0.1	1.55	
NO3-N	20-Jul-00	mg/L	0.1		6.64
NO3-N	24-Jul-00	mg/L	0.1	2.2	
NO3-N	17-Aug-00	mg/L	0.1		7.32
NO3-N	21-Aug-00	mg/L	0.1	1.47	
NO3-N	14-Sep-00	mg/L	0.1		8.11
NO3-N	18-Sep-00	mg/L	0.1	4.46	
NO3-N	19-Oct-00	mg/L	0.1		8.57
NO3-N	23-Oct-00	mg/L	0.1	5.76	

NO3-N	06-Nov-00	mg/L	0.1		7.58
NO3-N	08-Nov-00	mg/L	0.1	6.61	
NO3-N	09-Nov-00	mg/L	0.1		8.06
NO3-N	13-Nov-00	mg/L	0.1	6.18	
NO3-N	14-Dec-00	mg/L	0.1		8.87
NO3-N	18-Dec-00	mg/L	0.1	6.81	
NO3-N	18-Jan-01	mg/L	0.1		9.39
NO3-N	22-Jan-01	mg/L	0.1	6.89	
NO3-N	08-Feb-01	mg/L	0.1		8.18
NO3-N	12-Feb-01	mg/L	0.1	6.14	
NO3-N	13-Feb-01	mg/L	0.1		2.2
NO3-N	15-Mar-01	mg/L	0.1		9.66
NO3-N	19-Mar-01	mg/L	0.1	6.31	
NO3-N	12-Apr-01	mg/L	0.1		8.46
NO3-N	16-Apr-01	mg/L	0.1	4.85	
NO3-N	01-May-01	mg/L	0.1		7.55
NO3-N	02-May-01	mg/L	0.1		8.17
NO3-N	03-May-01	mg/L	0.1		8.45
NO3-N	04-May-01	mg/L	0.1		8.7
NO3-N	05-May-01	mg/L	0.1	5.2	
NO3-N	06-May-01	mg/L	0.1	4.83	
NO3-N	07-May-01	mg/L	0.1	4.84	
NO3-N	08-May-01	mg/L	0.1	4.54	
NO3-N	10-May-01	mg/L	0.1		9.76
NO3-N	14-May-01	mg/L	0.1	3.56	
NO3-N	07-Jun-01	mg/L	0.1		7.95
NO3-N	11-Jun-01	mg/L	0.1	2.93	
NO3-N	12-Jul-01	mg/L	0.1		6.74
NO3-N	16-Jul-01	mg/L	0.1	2.34	
NO3-N	02-Aug-01	mg/L	0.1		7.69
NO3-N	06-Aug-01	mg/L	0.1	2.95	
NO3-N	16-Aug-01	mg/L	0.1		6.96
NO3-N	20-Aug-01	mg/L	0.1	3.83	
NO3-N	06-Sep-01	mg/L	0.1		7.99
NO3-N	10-Sep-01	mg/L	0.1	3.99	
NO3-N	04-Oct-01	mg/L	0.1		7.98
NO3-N	08-Oct-01	mg/L	0.1	4.21	
NO3-N	05-Nov-01	mg/L	0.1		7.14
NO3-N	08-Nov-01	mg/L	0.1	4.12	
NO3-N	06-Dec-01	mg/L	0.1		9.87
NO3-N	10-Dec-01	mg/L	0.1	8.27	
NO3-N	10-Jan-02	mg/L	0.1		8.29
NO3-N	14-Jan-02	mg/L	0.1	6.68	
NO3-N	04-Feb-02	mg/L	0.1		7.44
NO3-N	07-Feb-02	mg/L	0.1	6.94	
NO3-N	07-Mar-02	mg/L	0.1		9.68
NO3-N	11-Mar-02	mg/L	0.1	5.93	
NO3-N	04-Apr-02	mg/L	0.1		7.6
NO3-N	08-Apr-02	mg/L	0.1	5.47	

NO3-N	10-Apr-02	mg/L	0.1		7.66
NO3-N	14-Apr-02	mg/L	0.1	5.31	
NO3-N	06-May-02	mg/L	0.1		6.8
NO3-N	09-May-02	mg/L	0.1	4.05	
NO3-N	06-Jun-02	mg/L	0.1		6.76
NO3-N	10-Jun-02	mg/L	0.1	2.91	
NO3-N	11-Jul-02	mg/L	0.1		6.44
NO3-N	15-Jul-02	mg/L	0.1	2.71	
NO3-N	05-Aug-02	mg/L	0.1		6.1
NO3-N	08-Aug-02	mg/L	0.1	3.21	
NO3-N	04-Sep-02	mg/L	0.1		6.73
NO3-N	08-Sep-02	mg/L	0.1	3.99	
NO3-N	03-Oct-02	mg/L	0.1		7.91
NO3-N	07-Oct-02	mg/L	0.1	5.3	
NO3-N	05-Nov-02	mg/L	0.1		7.49
NO3-N	07-Nov-02	mg/L	0.1	5.94	
NO3-N	05-Dec-02	mg/L	0.1		9.1
NO3-N	09-Dec-02	mg/L	0.1	5.91	
NO3-N	16-Jan-03	mg/L	0.1		8.78
NO3-N	21-Jan-03	mg/L	0.1	6.83	
NO3-N	03-Feb-03	mg/L	0.1		8.47
NO3-N	13-Mar-03	mg/L	0.1		8.95
NO3-N	17-Mar-03	mg/L	0.1	1.79	
NO3-N	03-Apr-03	mg/L	0.1		9.62
NO3-N	07-Apr-03	mg/L	0.1	6.44	
NO3-N	05-May-03	mg/L	0.1		7.25
NO3-N	08-May-03	mg/L	0.1	3.77	
NO3-N	12-Jun-03	mg/L	0.1		6.88
NO3-N	16-Jun-03	mg/L	0.1	3.98	
NO3-N	10-Jul-03	mg/L	0.1		6.67
NO3-N	14-Jul-03	mg/L	0.1	3.35	
NO3-N	11-Aug-03	mg/L	0.1		7.09
NO3-N	14-Aug-03	mg/L	0.1	4.44	
NO3-N	11-Sep-03	mg/L	0.1		6.82
NO3-N	15-Sep-03	mg/L	0.1	4.42	
NO3-N	09-Oct-03	mg/L	0.1		6.97
NO3-N	13-Oct-03	mg/L	0.1	2.31	
NO3-N	03-Nov-03	mg/L	0.1		6.49
NO3-N	06-Nov-03	mg/L	0.1	3.68	
NO3-N	04-Dec-03	mg/L	0.1		8.27
NO3-N	08-Dec-03	mg/L	0.1	5.41	
NO3-N	08-Jan-04	mg/L	0.1		9.31
NO3-N	12-Jan-04	mg/L	0.1	6.17	
NO3-N	19-Feb-04	mg/L	0.1		3.37
NO3-N	05-Mar-04	mg/L	0.1		5.75
NO3-N	01-Apr-04	mg/L	0.1		7.82
NO3-N	05-Apr-04	mg/L	0.1	4	
NO3-N	06-May-04	mg/L	0.09		8.79
NO3-N	06-May-04	mg/L	0.1		9.04

NO3-N	10-May-04	mg/L	0.1	3.64	
NO3-N	10-Jun-04	mg/L	0.1		7.95
NO3-N	14-Jun-04	mg/L	0.1	3.96	
NO3-N	08-Jul-04	mg/L	0.1		7.29
NO3-N	12-Jul-04	mg/L	0.1	4.27	
NO3-N	05-Aug-04	mg/L	0.1		6.39
NO3-N	09-Aug-04	mg/L	0.1	3.03	
NO3-N	07-Sep-04	mg/L	0.1	4.02	
			AVEARAGE	**4.86**	**7.71**
			% NO3 LOSS		**63%**

(The following comments were received after the Public Hearing documents were sent out on November 1, 2004. These comments were also addressed in the December 20, 2004 Supplemental Staff Report.)

Gene Zimmerman
Forest Supervisor
San Bernardino National Forest Supervisor, US Forest Service, USDA
Letter dated December 2, 2004

Comment
Forest/open space areas naturally export nutrients, which the proposed TMDL/load allocations for these areas do not take into account. These areas should be considered potential problems only if there is supporting evidence, such as nutrient export rates that exceed the rates expected for these ecosystems under relatively natural conditions. Based on nutrient export data from natural forested areas in the western United States, the nutrient export rates for forested lands draining to Canyon Lake and Lake Elsinore assumed in the TMDL Watershed Model are within natural conditions. Thus, forested lands in the watershed are functioning relatively naturally with respect to nutrient export and are not a source of water quality impairments in the downstream lakes. In light of this, the load allocations for forest/open space areas should be revised and the USFS should not be required to participate in the following proposed TMDL Tasks:

- Task 4: Nutrient Water Quality Monitoring Program
- Task 8: Forest Area – Review/Revision of Forest Service Management Plans
- Task 9: Lake Elsinore In-Lake Sediment Nutrient Reduction Plan
- Task 10: Canyon Lake In-Lake Sediment Treatment Evaluation
- Task 11: Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates
- Task 12: Pollutant Trading Plan

If this approach is not suitable to the Regional Board, the USFS believes that at most only Task 8 should apply, but only under a scenario wherein the proposed 27% reduction in nitrogen is eliminated and the proposed 79% reduction in phosphorus is decreased to a nominal amount.

Staff Response
As discussed in the December 20, 2004 Supplemental Staff Report, staff have reviewed the data provided by USFS staff and agree that the following revisions to the proposed load allocations for forest/open space lands for nitrogen and phosphorus are warranted.

For nitrogen, existing loads as simulated by a watershed model and calibrated with monitoring data are within the literature values for natural areas. Therefore, staff proposes that no reduction for nitrogen be required from forest/open space land uses; the existing nitrogen loads are proposed as the final load allocation.

For phosphorus, the modeled phosphorus loads from the forest lands in the watershed are higher than the literature values provided by USFS. Board staff compared the existing phosphorus load to the average phosphorus load from western forests and determined that in order to meet the proposed TMDL, a 5% reduction is needed from forest/open space lands. This revision is shown in Errata Sheet No. 1.

Board staff does not agree that only Task 8 should be required of the USFS. Since forest/open space lands do contribute nutrients to Canyon Lake, we believe that it is appropriate that USFS be responsible (along with the other identified responsible parties) for monitoring, development of in-lake nutrient reduction programs and update of the TMDL watershed model. Staff notes that it may be that the contribution from the USFS would be small in comparison to those of other parties, given the relative amount of nutrients emanating from forested lands and that most of these loads appear to result naturally.

Phil Miller
Director of Engineering
Elsinore Valley Municipal Water District
Comment sent via email on November 16, 2004

Comment
EVMWD anticipates that in the future, in addition to the Colorado River Water (CRW), imported water from the State Water Project (SWP) will also be used to supplement Canyon Lake levels. SWP contains low concentrations of phosphorus when compared to non-detect phosphorus concentrations in CRW. EVMWD may use up 10,000 acre-feet of SWP and since the primary use of this water is to provide for domestic use, this water would be pumped out of the reservoir as needed. The WLA for supplemental water should not preclude the addition of high quality SWP water to the lake.

Staff Response
Staff evaluated the water quality data for the SWP water and CRW provided by EVMWD staff. As discussed in the December 20, 2004 Supplemental Staff Report and as shown in Errata Sheet No. 1, staff has made the change to WLA for supplemental water to Canyon Lake using the average nitrogen and phosphorus concentrations and a volume of 1,006 acre-feet/year. Even though the amount of supplemental water added to Canyon Lake may increase up to 10,000 acre-feet, it is expected that the same amount of water would be extracted out of the lake, resulting in no net increase in the volume of supplemental water to Canyon Lake. Staff continue to assume that the net volume of imported water would be 1,006 acre-feet; which was used to revise the WLA as shown on Errata Sheet No. 1. EVMWD staff have indicated their agreement that the revised WLA for supplemental water for Canyon Lake is reasonable.